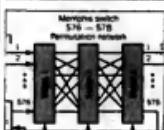


COMPUTERWORLD

\$2/COPY; \$44/YEAR

DECEMBER 22, 1986

VOL. XX, NO. 51

INSIDE

Executive Report — Parallel processing: The next generation is under way. **Page 35.**

In Depth — Remembering the days when DP managers had to wield wrenches, not budgets. **Page 33.**

"Charge it!" may be the cry of shoppers this week, but for Honeywell and CDC, the decision is to "charge off" the expenses of reorganization. **Page 56.**

There's little seasonal joy at AT&T, where 27,400 jobs will be slashed and a whopping \$3.2 billion expense will wipe out fourth-quarter profits. Meanwhile, IBM's early-return "gift" is accepted by 10,000 employees, at a cost of \$250 million. **Page 56.**

Reaction to the New Year's resolution to be slipped into the tax reform bill prompts U.S. Sen. Moynihan to form a task group to clarify the impact on independent programmers. **Page 9.**

The Ghost of Christmas Present came early to a California HBO, leading hundreds of MIS professionals on a visit into the realm of nontechnical end-user equipment. **Page 2.**

Don't get stuck with a lump of coal: A former IBM employee tells how to predict when mainframe residual values will dip. **Page 29.**

MAP hasn't made it under the tree this year at Fortune 500 companies, where software engineering costs are seen as too high. **Page 25.**

Software firms end year with a bang

VAX surge brings strong quarter

By Charles Babcock

The closing quarter of 1986 is providing a powerful spur in revenues for a number of software companies formerly smarting from the prolonged 1985-1986 slowdown, particularly for those that have diversified away from dependence on IBM mainframe system sales.

The last quarter of the year is typically the strongest in generating revenue as corporate customers make buying decisions that had been postponed for competitive evaluation or chilled by IBM product moves earlier in the year.

Companies like Software AG of North America, Inc., McCormack & Dodge Corp. and Cincom Systems, Inc. report a growing share of their revenue coming from the VAX marketplace.

Likewise, companies such as Panospheric Systems, Inc., Management Science Ameri-

ca, Inc. and Computer Associates International, Inc. have rushed to acquire firms that offer Digital Equipment Corp. VAX software.

Cisco reports a 30% growth in revenue this quarter compared with revenue of a year ago, fueled by sales of its Supra relational data base management system and both DBMS and manufacturing systems for the VAX.

VAX products represent 20% of Cincom's current year, up from 11% last year, according to Thomas McLean, Cincom vice-president for marketing.

"Just about everybody has a VAX product," notes Robert Thivierge, an analyst for Paine Webber, Inc.

In addition, several large companies are renewing their interest in providing services as well as packaged software. Among the latter are application leader MSA in Atlanta, Policy Management Systems Corp. in Columbia, S.C., and Collinet Software, Inc. located in See SOFTWARE page 4

HOLIDAY WISH LIST

Deck the halls with tools, by golly!

By David A. Liedman

Despite the current preoccupation with communications, compatibility and distributed processing, the sugarplums dancing in the heads of some MIS managers this holiday season spring from a more traditional concern: programmer productivity.

The wish lists of managers surveyed by Computerworld address quite a variety of other issues as well, including more contemporary concerns with communications and corporate cohesion.

George DiNardo, executive vice-president of Pittsburgh's Mellon Bank, N.A., says he wishes for "one thing and one thing only — error-free code."

Errors stem in part from complicated, changing federal regulations, he claims.

"I want a voice tube that you speak into and out the bottom comes code," DiNardo says.

Larry van Goetham, director of corporate systems at Sara Lee Corp. in Chicago, says his wish list is topped by better productivity tools for his staff, such as fourth-generation languages.

Their comments reflect the perennial nature of concern with programming.

DiNardo took part in Computerworld's survey of wish lists last year, when he said he yearned for software productivity aids.

Again in the programming arena, Laurence T. Burdene, corporate vice-president of Firestone Tire and Rubber Co. in Akron, Ohio, would like to see his staff get up to speed in

See DECK page 11

**Bull's U.S. plans**

An interview with company president Francis J. Berto, page 6.

PC managers facing tough network choices

Early buyers risk conversion costs

By Elisabeth Horwitz

Users of personal computer networks face a thorny dilemma: Put those networks on hold until IBM's LU6.2 peer-to-peer networking strategy pays off in available products, or buy current networking products and face a tremendous conversion cost at a later date.

"IBM says migrating from NetBIOS to LU6.2 will be easy, but I'm not sure about that at all," says Steven Berto, office systems project manager for Metropolitan Life Insurance Co.

IBM and PC networking vendors are plugging their customers with promises of LU6.2 products in the future. But these early arrivals are likely to offer either low-level gateways between the PC net-

work and IBM's Systems Network Architecture (SNA), or a way to have LU6.2 perform the same functions that already exist on a PC network, industry authorities claim.

"What is required over the long term is transparent PC-to-mainframe access, allowing people to call up Ashton-Tate's Dbase III and have it query the mainframe, access data and bring it down. No one [in the industry] is doing that right now," says Roy Folk, Ashton-Tate executive vice-president.

A lot of software will need to be written in order to tie together the pieces of this revolutionary micro-to-mainframe communications environment, and for some time, customers will be writing their own software to fill in the gaps not yet addressed by the vendors.

On the other hand, if they can play it safe until LU6.2



FCC plans contract rate deregulation

By Mitch Betts

WASHINGTON, D.C. — The Federal Communications Commission last week unveiled a deregulation proposal that would give AT&T and local exchange carriers wide flexibility in pricing their packet services or any network service provided to large users under competitive contracts.

"It's clear that the proposal might provide the carriers with more flexibility, but whether that translates into lower prices is another matter," said James S. Blaszak, counsel for the Ad Hoc Telecommunications Users Committee.

The FCC said it intends to eliminate full-blown tariff regulation when such regulation could hinder the efficient, low-cost offering of certain services.

See FCC page 12

NEWS

Strike places MIS staffers in unusual end-user positions

By Jeffry Boster

OAKLAND, Calif. — Hundreds of MIS professionals at a Northern California health maintenance organization (HMO) last week resumed their usual duties after completing what amounted to an impromptu crash course in empathizing with end users.

In temporarily reassigning most of its information services staff to assorted end-user positions, Kaiser Permanente Medical Care Program suffered some short-term inconvenience and discomfort.

But in the long run, the experience will probably prove far more beneficial than harmful, according to Neal Bell, director of the HMO's information services unit.

Debriefing systems workers

So helpful, in fact, may the personnel transfers ultimately prove that Kaiser plans soon to debrief its systems employees and solicit their advice for improving the organization's future development efforts, according to Doug Poole, manager of the organization's systems and programming group.

Under normal conditions, the information services staff at Kaiser consists of some 300 analysts, programmers, managers, data base technicians and other high- or mid-level systems specialists.

But from late October until mid-December, all but a handful of Kaiser's MIS employees were assigned tasks that are ordinarily performed by computing novices.

During a seven-week walkout by 9,000 of the HMO's unionized workers, who called the strike to protest a proposed restructuring of their wages, Kaiser suspended most of its regular computing activities and resorted to the personnel reassessments.

Not until Dec. 18, five days after union members voted to accept a compromise pay plan and end their highly visible work stoppage, did the last of the transferred systems professionals return to their preferred occupations.

"Many of the systems people who

filled in for striking end users never once had an opportunity to work with any automated applications during the entire episode," Poole said. "Instead, they were assigned to housekeeping tasks or performed a broad range of other functions that required minimal manual labor."

For at least some of its reluctant takers, the sweeping reemployment of Kaiser's MIS work force had its negative side. Al Sandberg, the HMO's productivity support manager, found the abrupt redefinition of his job function frightening at times.

"The experience of suddenly doing something new made me anxious," Sandberg said. He worked part of the strike as a receptionist in Kaiser's physical therapy department and the rest as a systems operator in its medical charts and records libraries. In dealing with patients who are in distress and are waiting for much-needed treatment, Kaiser said, "you wonder whether you'll be able to handle the pressure or make a fool of yourself."

Unmatched opportunity

Is working intensively as users for an extended period, the Oakland-based facility's computing specialists have gained an unmatched opportunity to become as intimately acquainted as possible with what their non-technical counterparts need, Bell said. "How a system works in a test and debug mode is often quite different from the way it runs day to day in a production mode," he said.

"So when someone who has developed a system later becomes one of its users, the way he looks at the application and his approach to program design changes a lot," he added. Probably nowhere are Bell's observations more graphically illustrated than in the experiences of Paul Royer, an in-house consultant to Kaiser's end users. While the just-settled labor dispute lasted, Royer pulled a five-week stint as a systems operator in the HMO's regional payroll center.

His posting strengthened his belief that application developers need to heighten their sensitivity to their clients' demands.

E-mail centers clog during holidays

By Peggy Watt

Not only the U.S. Postal Service, but electronic mail centers, too, run the risk of a clogged system at holiday time.

A Hewlett-Packard Co. regional information systems director recently cautioned users to reserve business E-mail strictly for business, even when it might be tempting to send holiday greetings by electronic means.

It seems that recent months have seen users sharing electronic graphics, as well as sending personal notes and even E-mail chain letters over the corporate system. As many as 60,000 HP employees in the U.S. have mailboxes on HP Desk, the company's internal E-mail system, which is based on HP 3000 minicomputers.

"At times we have some abuse, but

it's never anything malicious," said Steve Peterson, who is based in the North Hollywood, Calif., sales office. He is not worried about running out of storage but just wants to restrict the system to its intended use and "let everybody know it's a limited resource."

Especially in a computer company, users tend to be more sophisticated technologically and more likely to experiment with creative messages such as graphics, said Mike Cavanaugh, executive director of the Electronic Mail Association in Washington, D.C.

"If you have a choice of sending holiday greetings by E-mail vs. paper, I bet E-mail ends up cheaper," he said. "But I'm sure there are thousands of examples of misuse of conventional in-house mail, too."

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As 1986 draws to a close, Oracle Corporation would like to share the warmest Seasons Greetings with the people who've helped to make this our most successful year. This year, Oracle's sales grew by 140% to over \$55 million, our profits increased 280%, our staff grew from 375 to over 800 talented professionals, and our product line entered a new era of performance, quality and diversity.

First and foremost, our thanks to the Oracle customer and user communities, who have placed their trust in ORACLE as a solution for their most challenging database and application problems.

Thank you for making us the fastest-growing software company in the world. We hope you share our enthusiasm about the exciting new products and services of this year... and those of the year to come.

Next, we thank our OEMs, whose ranks were swelled this year by the likes of IBM, NCR, ATT, and Wang. Our thanks to each of you. And, of course, thanks to old friends Prime, Stratus and Sperry (Unisys) and DG who've grown with Oracle over the years.

We thank our VAR relicensors, the vertical market software companies and systems integrators who have helped Oracle provide complete solutions to our customers' problems.

We thank our employees for tireless efforts through long nights and non-weekends and for their commitment to excellence and quality.

We thank the international community who've made ORACLE and SQL the standard from Canada to Europe, Australia to China.

We thank the ANSI SQL committee who have validated our commitment to the SQL language, pioneered by Oracle seven short years ago.

Finally, we thank Mimi, proprietress of the Oracle Cafe and Deli, who cooks the best imitation Egg McMuffins* in the world.

We hope you all will join us in an equally successful 1987.

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Bull exec stresses commitment to Honeywell business

Strategy hinges on distributed DP

By Alan Alper

NEWS YORK — Compagnie des Machines Bull will stress distributed data processing and networking when it begins running Honeywell, Inc.'s computer business sometime early next year, according to Francis Lorentz, president and chief operating officer of the French firm.

In an interview last week, the Bull executive went to great lengths to emphasize the firm's commitment to revitalizing the investments made by its Information Systems group's customers, following the agreement by Bull and NEC Corp. to purchase 57.5% of Honeywell's computer business [CW, Dec. 8].

The Honeywell installed base, many observers claim, has been neglected technologically during the last couple

of years, and many users have abandoned ship as the Minneapolis firm placed the majority of its resources into its controls and defense electronics businesses.

"We will focus our R&D and products strategically around distributed data processing and focus our development and skills on networking," Lorentz said.

Bull's proprietary network, distributed systems architecture (DSA), and its mid-range DPS 6 processor are well suited to the increasing market requirements for departmental requirements, Lorentz noted. The DSA network is based on Open Systems Interconnect standards, which Lorentz claimed will give the firm an advantage once the European-derived standards become a requirement of the U.S. market.

Bull will not only seek to preserve the Honeywell base but will try to attract new business, Lorentz said. The firm will not attempt to make

users convert applications to run under its operating systems but will offer standard operating systems like Unix and Microsoft Corp.'s MS-DOS and standard interfaces such as IBM's SQL for accessing relational data bases.

"Since our strategy is based on a distributed architecture, what we have to do is manage connectivity between all processors — our mainframes and others' mainframes," Lorentz said. "Therefore, we are investing in and promoting international communications standards and developing gateways between our networks and IBM's Systems Network Architecture."

Bull is not yet sure what it will do with the Multics operating system, which Honeywell said it would not support beyond 1994. Lorentz said Bull probably has as many customers running Multics as does Honeywell.

"In many cases we will be able to sell customers add-

ons to their mainframes and follow their needs in power until that date," Lorentz said. "It's unclear what we will do after that."

Once the acquisition is completed, according to Lorentz, Bull management would visit a number of Honeywell users. "It's important that Honeywell's customers know what Bull is able to do," he said. "We intend to make some organized presentations to customers and tell them what we've done and what our skills are."

Asked why Bull, which is 91% owned by the French government, could succeed where Honeywell had not, Lorentz said it was a matter of a "tighter focus." Honeywell was not dedicated fully to the information systems business. We are fully dedicated to the business. It's our only business, and we have to succeed," he said.

The Bull management team, led by Chairman Jacques Stern, is accustomed to

turnaround situations. When it inherited Bell almost five years ago, new management was faced with a company that had a legacy of losing money. The firm reported a small profit (\$10 million francs) in 1985 and expects a larger profit in 1986.

"We have successfully recovered and are now a \$2.5 billion company that is making a profit. Perhaps not enough, but some," Lorentz said.

Lorentz said the main issue facing users is how to provide customers with the tools to use their equipment better. These are not technical issues but marketing concerns, he noted.

"End users are wondering that if they add new equipment, will it make them more competitive and enable them to serve their customers better," Lorentz said. "Many companies have made major investments in electronic data processing, and it hasn't improved their productivity."

McDonald's, Illinois Bell begin six-month ISDN test

By Jean S. Barnes

OAK BROOK, Ill. — Voice, video and data transmissions shared the same standardized Integrated Service Digital Network (ISDN) connection for the first time at the McDonald's Corp.-Illinois Bell site trial initiated last week.

The two companies demonstrated how ISDN compressed digital signals from three types of transmissions and transmitted them together across a single twisted-pair line.

For McDonald's, the test begins a six-month trial period during which the company's information systems department and facilities management group will use ISDN equipment to conduct business.

"We consider ISDN to be a LAN [lo-

cal-area network] in and of itself," said Pat Krause, McDonald's telecommunications director. It has the potential of replacing dozens of LANS set up throughout McDonald's, he said.

Voice/data/video workstation

It is Illinois Bell's hope that daily use of ISDN-specific hardware at five McDonald's sites in Oak Brook will prove out the technology [CW, Dec. 11].

It should also guide systems designers in making integrated voice/data/video ISDN workstations. As it stands currently, separate telephone, video and CRT sets have to be used in conjunction with a terminal adapter to transmit ISDN's digitized mes-

sages.

McDonald's IBM 3270 terminal network currently links into ISDN through an AT&T protocol converter device, bypassing coaxial cable connections. ASCII devices including Digital Equipment Corp.'s VT220 terminals can use RS-232 connectors to the terminal adapter.

ISDN will not be generally available until at least 1988, according to Lou Rutigliano, Illinois Bell's marketing vice-president.

During last week's ISDN demonstration, Illinois Bell President Ormond Wade placed a call from an AT&T 7507 digital telephone set to a Fujitsu Ltd.-built digital telephone set answered by McDonald's U.S. President Ed Renzi, who was in McDonald's office building about one mile away.

Video images

After the connection was established, Wade turned on a modified Datapoint Corp. Mine videoconferencing terminal on which Renzi could be seen talking. A small television camera built into the side of the Datapoint set sent Wade's video image to Renzi as well.

Unfortunately, the connection was made in such a way that there was a second lag in Renzi's spoken remarks, something that could have been avoided, Illinois Bell spokesman said. If the demonstration had been wired differently,

The video image also seemed somewhat halting, because of the way compressed video systems "factor out" images that are not moving.

Finally, Wade pushed Send on his AT&T 6300 Plus personal computer to send a screen with McDonald's corporate logo to Renzi's PC. During the demonstration, Renzi, whose voice sounded slightly tinny, could be heard to say, "You folks at Illinois

Bell sure do have good taste."

Illinois Bell and AT&T have agreed to share ISDN technology with other divested Bell operating companies as it develops. But the immediate benefits of the test will go to McDonald's, which has only to pay for the phone lines.

Simplified network design

"The real essence of ISDN is that the network design is simplified to the greatest degree possible," said Bill Koenig, McDonald's vice-president of facilities and systems. "There is only one way in for information — and only one way out," she said.

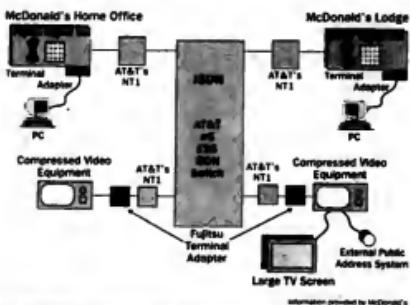
Illinois Bell district manager Steven Parrish said that, for now, Illinois Bell is absorbing all ISDN equipment costs while McDonald's pays service costs, which it would not specify.

"We're treating this test as a training sequence and an investment in the future," Parrish said.

Several hardware suppliers have agreed to provide ISDN gear. Hardware from AT&T Network Systems Group, Fujitsu America, Inc. and NEC America, Inc. was used at the demonstration, while hardware from Telrad, Hayes Microcomputer Products, Inc. and Harris Corp. is expected to be used at McDonald's in 1987.

McDonald's ISDN

First call configuration



CORRECTIONS

The correct name for the maker of the Besto software product, "Capacity planners look for benefits of expert systems" [CW, Dec. 15] is BOSS Systems, Inc.

Stock data for EMC Corp. and Endata, Inc. in the Dec. 15 Computerworld stock trading index were transposed.

Multics future dim despite Honeywell/Bull merger

By Rosemary Hamilton

The joint venture plans recently announced by Honeywell, Inc. ignited a spark of hope among its Multics community earlier this month as some users speculated that the joint venture might breathe new life into their discontinued operating system.

But a Honeywell official quickly doused such hopes by stating that the Multics strategy will not be altered.

"Obviously, there'll be some guys who'll want us to call the tooth fairy and bring back everything," said Eugene Manno, group vice-president of Honeywell's Information Systems group. "But the actions and direction we've taken will continue. I don't foresee any changes."

According to a top Compagnie des Machines Bull executive, the company is not yet sure what it will do with the Multics operating system, which Honeywell said it would not support beyond 1994. Francis Lorentz, president and chief operating officer, said in an interview last week that Bull probably has as many customers running Multics as does Honeywell.

"In many cases we will be able to sell customers add-ons to their mainframes and follow their needs in power until that date," Lorentz said. "It's unclear what we will do after that."

Nonetheless, one Midwest Multics user, who requested anonymity, said the Honeywell joint venture, which will merge Honeywell's Information System division with Bull and NEC Corp., leaves open a "possibility that the new company will take a second look at Multics."

"Maybe it's a one-in-a-million shot," he continued. "But maybe we can get someone to take a look at it."

It was more than a year ago that Honeywell announced it would stop further Multics development, and since that time it has been working with users, many of whom remain irate despite the decision to incorporate Multics features into a new version of the operating system, HVS 6 Plus, which will be available sometime in 1988 and will run on the vendor's newest line of minicomputers.

Some members of the Multics community, a small but highly visible group of users that includes Ford Motor Co., said they hoped the new company would reconsider Multics. Another chance, primarily because there's a substantial European Multics community — with a few dozen sites in France — that has bought systems through Bull.

Aislin Buis, head of the French Multics user group, said he would "love to see them reconsider" the fate of Multics, "but it's not evident."

"Bull may stand up on its hind legs and support its Multics users in France, or they could be wimpy and say Honeywell in the U.S. knows what they're doing and go along with it," said Bruce Sanderson, a software specialist at Ford and a member of the Multics review committee of the Honeywell Large System User Association (HLSUA). "But I'd say there's less than a 50% chance," he added.

Multics users of HLSUA recently presented four major features to Honeywell that they said must be im-

plemented in the new operating system for migration to be possible. Those features include the Multics Relational Data Base Store and the virtual file functionality as well as the PL/I language and third-party software support.

Manno said Honeywell will officially respond to users in the next few months. The Bull-controlled joint venture will continue with the Multics migration plan, he added.

Amiel Koenig, Paris bureau chief for the CW Communications International News Service, contributed to this report.

Quadram sheds laptop bugs

By Douglas Barney

NORCROSS, Ga. — After technical problems and the reassigning of engineers to other projects, Datavue Corp. will ship its Keystyle 80 laptop computer and Writestyle portable printer this month.

The products were originally set to ship last summer, but the response from beta-test sites, especially concerning the issue of IBM compatibility, lead to much of the delay.

"There have been some glitches in it. There were some things left out that we wanted to do, so instead of going into production, it went into another beta run," said Sharon Cappett, Datavue product manager. "We didn't want to have any major bugs."

In addition, some of the engineers from the Keystyle project were transferred to the Snap 1+1 project. Snap 1+1 is a recently announced laptop with a detachable keyboard that can be used separately. "When you start pulling people off of one project and changing projects, it takes a little longer. That did stall some of the Keystyle work," Cappett said.

Keystyle 80, first shown more than a year ago, can work with the Writestyle to provide the functionality of an electronic typewriter.

The \$369 Keystyle 80 can operate as a stand-alone laptop and will be available with an 80-char. by 8-line screen with built-in word processing and communications.



NEWS

Network utilization key issue among Dexpo attendees

Multivendor, cost solutions top goals

By Dennis Reimondi

NEW YORK — Networks — creating them, buying them and optimizing existing ones — were the main topic of conversation at the Dexpo conference held here last week.

While most third-party vendors hawked add-on networking equipment, disk-based management software, decision support systems or storage subsystems for Digital Equipment Corp. computers, users walked around looking for solutions to their networking problems.

"We want to optimize our network," said Irving Hesskell, telecommunications manager at Citibank N.A. in New York. The predominantly IBM installation also includes DEC VAX machines plus close to 5,000 Zenith Data Systems Corp. Z248 Personal Computers.

Hesskell said he wants to make his network more cost-effective and to add redundancy for safety. Although Citibank is satisfied with its existing network, the compa-

ny prides itself on being state of the art, he added. To that end, Hesskell was looking at data private branch exchanges, multiplexers and other communications products at Dexpo.

Two users with large networks were looking for ways to iron out some problems. "Lots of networking solutions don't work when you have a lot of different computers," said John Dallen, who directs computer systems for the Geographic Information System Department at the U.S. Military Academy in West Point, N.Y. "We've had a good handle on how to address the need to link 4,500 nodes that will be on the network," Dallen said.

West Point has equipment from Prime Computer, Inc., DEC, Unisys Corp., which is the partnership of the former Sperry Corp. and Burroughs Corp., and a variety of "odd machines" plus close to 5,000 Zenith Data Systems Corp. Z248 Personal Computers.

The pieces at West Point already send homework back and forth with their teachers on floppy disks, Dallen said. He wants to provide electron-

ic submission of assignments, a reduction in paperwork forms that are used in the presentation system and computer-aided instruction.

West Point will issue requests for proposals in the spring to find a vendor that can tie the entire campus together.

At Lehigh University in Bethlehem, Pa., an Intelcom, Inc. network links about 4,500 students and faculty to superminis and mainframes from Control Data Corp., DEC and IBM. "Our students talk to the library and all the mainframe computers for bulletins or information, talk back and forth with other microcomputers and exchange documents with professors," said George Drabin斯基, business manager for the university's microcomputer store, which supplies students, faculty and workers at Lehigh with micros and software.

The problem at Lehigh is linking multivendor equipment outside the major network system, Drabin斯基 said. "For instance, accounting needs a closed network for security reasons. The problem is compatibility and

bugs in the software. When people use different applications, it makes it hard to link smaller networks. Large networks are easy because they act like a telecommunications system," he said.

The search for LANs goes on, Drabin斯基 said. The process is hampered by vendor company mergers and reorganizations that change contact people, he added.

The multivendor environment does not make networking efforts easy, said Eric Janzen, of the German Space System in Bethesda, Md. Janzen said he firmly believes in sticking to one vendor wherever possible. His department has a Vaxcluster with a VAX-11/785 under VMS, for engineering and office automation. He also has three DEC Rainbows but uses three IBM Personal Computer XTAs, and a total of 16 Ethernet.

"Networking is going very well here. We use all DEC linking products," Janzen said. "The one-vendor approach minimizes the problem of integrating hardware and software." He claimed that the small price differential is worth it. "Staying with

one vendor saves time, aggravation and effort. When we have done some comparisons with departments at Grumman that use a multivendor approach, and we decided to stick with DEC."

Secretaries, engineers and analysts on a Strategic Defense Initiative space contract all have access to the same systems. Because the facility is closed for security reasons, the security features of VMS and the DEC All-In-1 offer automation package are good enough to keep people out of each other's desks, Janzen said.

"The speed of DEC's storage could be faster, but for us the I/O speed isn't the bottleneck. The CPU speed is the bottleneck because we are expanding a lot," he said. To rectify that, Janzen is adding a DEC 8800, an 8700 and a dozen RASI storage units to the cluster in 1987.

"DEC may not be the best choice in specific areas, Janzen said. For instance, it may not have the best terminal or server for the price. "But it makes life a lot easier that DEC has an integrated and comprehensive networking strategy."

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PC managers face choices

From page 1

based products become available, customers may have to put their PC networks on hold for several years.

PC network and software vendors, meanwhile, are scrambling to get on board the LU6.2 juggernaut before they get crushed.

At a recent seminar, Microsoft Corp. Chairman William Gates told his audience, "It's very critical for us to gateway through SNA in a variety of ways. From a personal and effective point of view, SPPF, I think, will probably be at the top of that list to start out with." Service Requester Program Interface (SRPI) has been described by some industry proponents as an entry-level PC-based LU6.2 product that forms a bridge to 3270 mainframe environments.

The irony is that the LU6.2 dilemma arises just as PC network protocols are finally coming into their own as a de facto networking standard, supported by a growing number of network hardware and PC software vendors.

Developed by IBM, Microsoft and Sytek, Inc., components such as the redirector and server message block (SMB) have been incorporat-

ed into an increasing number of popular PC networking hardware and software products.

Recently, several major big system vendors, including Digital Equipment Corp., Hewlett-Packard Co. and Tandem Computers, Inc., have announced SMB-compatible products that allow their hosts to act as servers on a PC network.

But while IBM may prove viable for non-IBM shops, a number of companies have chosen to wait for LU6.2 products to provide them with better ways to bridge the PC and SNA networking environments.

First National Bank of Chicago, for instance, recently decided that networking its mainframe environment to significantly expand its current limited base of IBM Token-Ring, Novell, Inc. and AT&T Starlan local-area networks. The bank also has more tentative, long-range plans to implement LU6.2-based peer-to-peer connections between its networks and its IBM hosts.

The goal is "to extend the integrity of the mainframe environment down to the workstation through interprocessor communications so that you can have, for instance, part of a DB2 database on a mainframe host and part on, say, an Intel Corp. 80386-based PC that would act as a server for a network of PCs," says Steven Jackson, First National Bank's vice-president in sys-

tems and MIS, who is responsible for technological planning.

However, Jackson does not see IBM offering practical peer-to-peer networking in the near term.

Metropolitan Life's Berto sees his company having document distribution over LU6.2 in two years and true cooperative processing in four years. The company currently uses Micro Tempus Inc.'s Tempus Link to connect Banyan Systems, Inc. PC networks to IBM hosts.

IBM has promised customers at least two LU6.2-based PC-to-mainframe products, Enhanced Connectivity Facility (ECF) and SRPI. ECF converts a mainframe into a PC server that provides virtual disks, file transfer, printer sharing and the like.

While companies wait for IBM to get its peer-to-peer act together, the PC networking and software vendors are continuing their own efforts to hook into the LU6.2 world. Network vendor Ungermann-Bass, Inc. currently supports the non-LU6.2 version of SRPI.

Both Banyan and 3Com Corp. have promised their customers future LU6.2 implementation on their PC networking products.

However, William Krause, 3Com's president, says he put LU6.2 support at the bottom of a list, below support of Unix communications protocol Network File System and Open Systems Intercon-

nected protocol PTAM. "I think that is also the priority order for the PC network market, which is driven by application software availability," Krause says. "Multiuser network software is finally coming out for SMB/redirection [protocols]. Now IBM starts spouting LU6.2 and companies say, 'Sure we'll have that — a long ways off!'"

Application software vendors such as Ashton-Tate look to Microsoft to cushion their migration to LU6.2. It is already possible to implement LU6.2 on top of MS-DOS 2.1, making it possible "to use LU6.2 to do the same things that can be done with the redirector/SMB, like sharing resources and files," Ashton-Tate's Palk says.

However, the difficult job of extending PC networking into more sophisticated LU6.2 functions "that go far beyond simple PC networking" still remains, according to Palk.

During a recent interview with Computerworld, Microsoft's Gates admitted that "internetworking is a gray area — we don't know where IBM's responsibility ends and ours begins."

"There is no conflict now between [PC networking protocols] and SNA," notes Microsoft Network Product Marketing Manager David Melin. "The potential conflict is in the timing and method of IBM's long-term plans, and whether SMB and redirector are in them."

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Consultants seek to ease tax reform impact on contractors

Meet with sponsor of 1706 provision

By David A. Lutman

An independent computer consultants' group has launched a drive to soften the bite of a controversial section of the Tax Reform Act of 1986 by limiting its effect to technical subcontractors who are placed in jobs by brokers.

Section 1706 of the tax act could force many independent computer workers — both contractors and subcontractors — to become employees of organizations they work for, requiring income taxes to be withheld from their pay and eliminating many tax deductions they have been able to use.

Amid outcry from many independents last week, representatives of the section's sponsor, Sen. Daniel Patrick Moynihan (D-N.Y.), formed a task force to try to clarify it. Moynihan, a member of the Senate Select Committee on Small Business, met with representatives of the Independent Computer Consultants Association (ICCA) and officials of Congress's Joint Tax Committee and the Internal Revenue Service.

Repeal campaign

The ICCA, a leading opponent of Section 1706, may mount a campaign to repeal it, but first must clarify how members should address the bill when it takes effect Jan. 1, said Tim Haake, an attorney for the group.

The group will try to limit the section's impact to subcontractors working through brokers, he said. Government officials asked the ICCA to provide them with information that will help them interpret the section by Monday. "They want us to take a first shot at it, and they'll give us their reaction," Haake said.

Under Section 1706, starting Jan. 1, free-lance technical service workers will bear the burden of proof that they function as independent businessmen rather than employees. They must do so by addressing 20 common law principles that the IRS uses to determine whether a taxpayer is an employee.

The principles address issues such as whether the worker is paid by the hour, week or month or in a lump sum, has invested in equipment, provides services in a continuing relationship or carries a profit or loss.

"My belief is that the vast majority will remain independent contractors, but they must go through the burden of proof," Haake said. The ICCA hopes the IRS will issue guidelines for declaring independent or employee status by year's end, he said.

According to several accounts, a drive to include Section 1706 in the tax law was spearheaded by the National Technical Services Association (NTSA), a trade group of 79 technical services firms, and in particular by Joseph Siders — vice-president and counsel of NTSA member CDI Corp. in Philadelphia, president-elect

of NTSA and chairman of its Legal and Legislative Committee. Siders could not be reached for comment.

David Hicks, president of the Software Consultants' Brokers Association and chairman of David Hicks Associates of San Francisco, said CDI's Siders spearheaded the proposal of Section 1706. Siders testified for a

similar state proposal in California and said NTSA pushed for Section 1706, he added.

Chris Quackenbush, owner of Q Tech, a consulting, technical services and temporary help firm that until recently was an NTSA member, said she also believes CDI and Siders led the drive. Her firm recently quit NTSA, in part because of the group's

opposition to independent consultants, she said.

Joe Morris, director of member services for NTSA, whose members compete with service brokers and independent contractors, said there was contact between members of the group and Moynihan's office but that he did not know which members were involved.



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NEWS

Upgrade for Lotus 1-2-3 extended

Release 2.01 handles compatibility bugs

By Douglas Barney

CAMBRIDGE, Mass. — Lotus Development Corp. has indefinitely extended its upgrade program for Lotus 1-2-3 Release 2.01, the latest version of the product that solves most, but not all, of the compatibility problems with earlier versions.

"Our customers are telling us that we made the important fixes concerning the compatibility issue. They understand that ultimately, when you fix something in place, it is going to pop up and hit you on the compatibility side again," said Peter Simon, general manager of Lotus' Business Applications Group. "So we did the best we could in the time frame that we felt we needed to do it in, from a marketing standpoint."

Most users said they are satisfied with Release 2.01, which was announced after customers complained about incompatibilities between 1-2-3 Version 1A and its successor, Release 2.

For one user, however, Release 2.01 is not compatible enough.

First Bank Systems, Inc. uses 1-2-3 extensively — in conjunction with more than 50 packages of Fast from Financial Proformas, Inc. in Walnut Creek, Calif. — to analyze financial statements.

First Bank originally used Fast in conjunction with 1-2-3 Version 1A and reported no compatibility problems; the bank ran into problems when it began to upgrade to Release 2.

'Minor incompatibilities'

Those problems have persisted with Release 2.01. "We are starting to find minor incompatibilities, but we have narrowed down what the problem is just. We know that it is giving some different results than expected," said David DeVries, senior micro analyst for First Bank Systems Information Services, a subsidiary of First Bank Systems.

"In printed reports we are getting text where we would have expected numbers. That is all that we are finding now, that our reports are coming incorrectly," DeVries said. Despite the continuing problems, DeVries said he believes Lotus has done a good job of increasing the level of compatibility.

According to DeVries, Financial

Proformas is modifying Fast to work with the latest version of 1-2-3 and has been working with Lotus to correct the problem. "They have been helpful," said Bill Kinney, vice-president of Financial Proformas.

Others report few problems

Other users report few or no problems with Release 2.01. "For the most part, it seems to have solved most of the compatibility problems," said Judy Gagnon, manager of office automation for Grumman Corp. in Bethpage, N.Y.

Another user reported only minor problems that center around the documentation. "We have found some inconsistencies with 2.01. Sometimes the text is different from the earlier version, but only the more sophisticated user runs into the problem," said Kathy McKinney, manager for technical support for end-user computing services at Nynex Services Co. in Boston.

"We have resolved the problems on our own and then informed Lotus," she added.

According to Lotus' Simon, the upgrade program has been highly successful. Some 40% of all 1-2-3 Version 1 or 1A users have upgraded to Release 2 or 2.01, he said.

Deck the halls with tools

From page 1

computer-aided software engineering (CASE).

"I think all the technology we need is out there," Burdons says. "I'd wish our organization were through the learning curve and would be using CASE routinely for the major systems that we need to build in-house."

Broad management concerns also are prominent on the wish lists. John K. Langenbahn, vice-president of information resources at MSA Corp. in Dayton, Ohio, says his first wish is for "more creative thinking in terms of applications for information technology throughout our company." Much of the creative thinking should come from line managers, Langenbahn says he believes.

Integration of MIS and management

At Best Products Co., Inc. in Richmond, Va., data administration and information center manager Kathryn M. Barley would like to closer integrate the MIS department and corporate direction.

"People keep [giving it] lip service ... but I still don't see it happen," she says.

MIS workers need to be more like business professionals rather than "just data processing professionals," Barley adds. "People look at themselves as little modules that can move from company to company," she says.

A similar wish comes from Gerald E. Sexauer, manager of MIS at McDonnell Douglas Corp.'s Information Systems Group in St. Louis. He wants "an organization that would pull MIS in one direction." Various departments with differing needs "choose

not to recognize each others' priorities," Sexauer says.

Compatibility seems to be the leading wish concerning technology. At McDonnell Douglas, Sexauer's group uses Data General Corp. and Digital Equipment Corp. systems, one on Convergent Logic Frontend and the other different set works. That has created duplication among programming and maintenance staffs. "I'd certainly like to get one language and one box," Sexauer admits.

Solidified standards

A solution to a different compatibility issue heads with the list at Carolina Freight Carriers Corp. in Cherryville, N.C., which is developing electronic data interchange.

"It sure would be nice to get all these standards solidified and everybody adhering to them and using them. That would be a major accomplishment for us," says Larry J. Patterson, the company's director of systems, programming and software.

On the technology side at Best Products, Barley is looking for better integration of micro computers and mainframes. "It looks like things are kind of coming together but you really don't know that until vendors say they have the solution, but I haven't seen it yet," she says.

At Sara Lee, Goethals also has a wish in the communications realm. He would like "more stability in the data communications area." Since deregulation of telecommunications, he says, the people he must deal with at local and long-distance carriers have constantly changed.

In the holiday spirit of giving, at Best Products Barley's list includes items for top managers — advances in artificial intelligence and user-friendly hardware to get them using more products. "That's the key to getting them involved — friendly things for them to use," she says.

Televideo set to join 80386 parade in June

SUNNYVALE, Calif. — Televideo Systems, Inc. last week disclosed that it is working on a computer based on the Intel Corp. 80386 microprocessor that will be ready to ship by June 1987.

According to a source close to the company, Televideo's 80386 product strategy will follow its strategy for its Intel 80286-based line.

As a result of this strategy, the 80386 machines can be used as stand-alone workstations, or they can operate as local-area network (LAN) file servers running Novell, Inc.'s Advanced Network.

RS-422 ports as bridges to LANs

Like the firm's existing line, the 80386-based machine should include RS-422 ports to provide a bridge to other LANs as well as communications coprocessors.

The systems will connect to the Unix environment using software provided by Microport Systems, Inc. and Locus Computing Corp., the source indicated.

The Televideo source said the firm would sell systems already configured with monitors and disk drives, in some cases including a hard disk, and would price the systems aggressively.

The firm is expected to sell the systems to work in conjunction with its terminals and diskless workstations, the source said.

— Douglas Barney

Grid axes OS, uses MS-DOS

By Douglas Barney

MOUNTAIN VIEW, Calif. — In a move similar to broadening and enhancing the use of its software, Grid Systems Corp. has rewritten its line of proprietary integrated software to run under Microsoft Corp.'s MS-DOS 3.2. The announcement also means the end of the line for GridOS 0.6, a proprietary operating system for Grid laptop computers. "Basically Grid OS is going away," said Grid spokesman Ed Murphy.

The applications software includes a set of tools used to develop custom applications for field professionals. Specific applications provided by the firm's integrated package include data base management, word processing, communications, graphics, electronic mail, a spreadsheet and a database organizer.

The key benefit for users is the ability to switch easily between Grid applications and other applications running under MS-DOS.

Prior to the Grid announcement, users had to switch from Grid OS to MS-DOS, both of which run on Grid laptops. "Grid users wanted access to MS-DOS applications," said Vicki Mason, systems software product manager for Grid. "Now there is no need to reboot to bring up MS-DOS." Grid software will be available to users of non-Grid systems but will initially be aimed at the Grid user community.

For one user, however, the Grid announcement had little value. "We don't use the Grid operating system. Everything already runs under MS-DOS," said David Barto, field applications manager for Chrysler Corp. "At some time in the future we may look at it more closely."

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NEWS

FTD network keeps florists on top of peak holiday season

By John S. Beaman

CHICAGO — It is computers, not telephones, that carry out most of the cross-country requests for flowers that have to be delivered to Grampian's florists in And, in the two weeks preceding Christmas, Florists Transworld Delivery Association's (FTD) Floral Network, Inc. subsidiary will handle more than one million orders — up to 25,000 transactions per hour — for floral arrangements from thousands of florists across the country.

In Chicago, where FTD's Floral Network is based in a turn-of-the-century downtown building, a three-CPU Unisys Corp. (formerly Sperry Corp.) 1100 system is experiencing one of its peak periods. The orders are flowing in from computer terminals at 11,000 floral shops nationwide — nearly half of the shops in FTD's 23,000-member association.

The computer network is vital to the continued growth of FTD business, says FTD Executive Vice-President William Maas. "The Mercury computer network has become so important to FTD that in terms of dealing with the tremendous surge of Christmas business that many shops simply would be lost without it," he said. "Almost 1.5 million orders will be handled on the system by Christmas Eve."

Only Mother's Day views with the Christmas season as a greater generator of floral sales. Dennis Blondell, assistant director of operations at Floral Network, is well aware of why the computer peaks occur in May and December. "Sometimes we wish Mother's Day lasted a whole month," he joked. "We're working on it." When the peaks are not present, the Floral Network rents excess computer capacity to other corporations.

Each floral order is assigned one

of five priority levels, ranging from immediate processing to two hours to 48 hours. This levels out the orders and holds back early orders that do not need to be filled right away. The computer system decides when to process the orders.

In general, florists are pleased with the Mercury ordering system, which extends from Alaska and Hawaii throughout the continental U.S. and Canada. "It makes our work a lot easier," says Richard Daudeuil of Daudeuil Flowers and Gifts in Westchester, Ill. "It's all done automatically when you press the Send button. You don't have to report everything on paper, he notes."

After florists press the Send button, Floral Network's three-CPU, 36M-byte 1100/73 computer from Unisys Corp. runs the orders through its transaction-processing programs, then sends electronic reports to FTD headquarters in Southfield, Mich., where all the paperwork for the 12,000 off-line florists is handled, generated on a IBM 4341 mainframe.

All florists get computer-generated reports twice a month from Southfield's IBM 4341 showing how many orders were sent to other florists and how many were filled on site.

FTD, which keeps track of these billings, remains a non-profit association, the result of a Detroit-based effort in 1910, which was organized as the Florists Telegraph Delivery Association.

But it is Floral Network's Member Services group that has the job of supporting the computer users in those florist shops, mostly over the phone. Repairs on the units are handled by swapping out and replacing faulty parts. Phone lines are also suspect in cases of ordering difficulties. For that reason, Blondell said, Floral Network has the capability to switch

into — or out of — three telecommunications carriers: AT&T, MCI Communications Corp. and Western Union Corp. "We didn't want to be vulnerable to any one vendor," he says. "That way, we can always route our traffic to another carrier in a matter of minutes."

Sometimes florists want to question the placement of an order or report a hardware problem. This is when Floral Network employees use Unisys' Mapper automated query language to query the mainframe. Mapper allows about two dozen Chicago employees sitting at two circular "help desks" to field phone inquiries and track complaints through the Unisys system. Floral Network maintains records of all transactions on disk for 30 days, then transfers them to tape.

Because Mapper is an automated query language, Floral Network employees can call up preprogrammed queries or ask ad hoc questions if needed. For most complaints, the help desk personnel type in Easy to pull up a screen showing the terminal equipment in the caller's florist shop.

They can then view a florist's hardware history at a glance. Easy is just one of more than 400 programmed routines in Floral Network's Mapper vocabulary.

"You can think of Mapper as a filing cabinet," says Joel Friedman, manager of Floral Network member services. "It's a structured way to search for data that's already in the system."

Floral Network has been using the automated query language for eight years to keep track of all its transactions, orders and network hardware support service. Even phone surveys done by Floral Network are keyed directly into Mapper files. For all its utility, Mapper takes up relatively little overhead, about 20.5K bytes, Friedman estimates.

Florists, however, cannot gain access to the Mapper system. Instead, they are linked to the Floral Network ordering system via ASCII terminals or Digital Equipment Corp. personal computers. For \$60 a month, florists rent the terminal equipment they

need to place computer orders. The equipment is owned by FTD, which this fall launched a massive upgrade campaign throughout its network.

There are several types of equipment used in the Floral Network: a 10-year-old Ford Aerospace & Communications Corp. terminal, several types of DEC personal computers and a new system, called Mercury 2000, based on Lear Siegler, Inc. (Zenith Corp.), Z-80 microprocessors, Okidata Corp. printers and Ancira Automation Inc. modems. In October, the first group of the older Ford terminals was replaced by the Lear Siegler-based microcomputer systems. Under a mandatory swap-out program, the rest of the nearly 10,000 Ford units will be gone by 1988.

The Ford technology was simply outdated, says Blondell, and the bulky printers under the 45-lb. unit's covers often jammed or failed. So far, 600 terminals have been replaced, with thousands to go before the program is finished in 1988. "Installation and training are done over the phone," Blondell says. "We send the



FTD's data center operation

florists the installation instructions and a manual, and then we take them through it over the phone."

About 1,000 florists have opted for two systems based on DEC PCs. One is based on a DEC Rainbow PC with 384K of memory and a 10MB-hard disk, while the other is based on a Micro-11 PC with 512K of memory and a 31MB-hard disk. Both have the ability to place FTD orders and handle the florist shop's accounting through value-added software packages.

The two DEC systems may be purchased by florists or leased for \$80 to \$300 a month, depending on configuration. The DEC systems do not have to be swapped out under the upgrade program, Blondell said, and neither about 40 additional units based on an IBM Personal Computer XT.

By 1990, all Floral Network orders will be sent from up-to-date equipment, Blondell says. By then, the network should also be somewhat bigger. "We definitely intend to expand the network," says Robert Poirier, director of operations at Floral Network. "We have developed a five-year plan that calls for the addition of 5,000 to 7,000 additional members to our network by 1990."

Having more florists on-line should help keep overall costs low, as well as speed FTD orders in general. In short, Maas says, expansion of the Mercury network is virtually inevitable. "Technology has become the underpinning of FTD's future," Maas says, "and our computer strategy is an important part of that future."

FCC plans deregulation

From page 1

The dramatic proposal would substantially reduce traditional tariff regulation in two areas in which the FCC believes the dominant common carriers face intense competition: data transmission via packet-switched networks and networks provided to large business and government users under contracts awarded through a competitive bidding process.

The commission said it would streamline tariff regulation by requiring less detailed justification in the filing and by presuming that the carriers' tariffs are legal from the start. This shifts the burden of proof,

which traditionally fell on the carriers, to any challengers.

The FCC tentatively concluded that contract services are inherently competitive because the user expects to get bids from numerous vendors.

"It's where the customer says, 'I see it as competitive, and I don't need the FCC to protect me [from monopoly pricing],' " said Albert Halprin, chief of the FCC's common carrier bureau.

Officials acknowledged that safeguards would be necessary to prevent the carriers from abusing the deregulation of contract services.

Contact services

Commissioner Patricia Diaz Dennis said she is seeking comments on whether contract services could include "plain vanilla" telephone service under the guise of a contract bid or whether they should be restricted

to unique, customized services.

The FCC also tentatively concluded that packet services are competitive because these services are offered by other providers — including the value-added network vendors, AT&T and the regional holding companies — and none appear to have monopoly power over the market.

FCC officials said they are seeking comments on whether there are other services that are sufficiently competitive to merit the same unregulated treatment. Public comments on the proposal are expected in January and February, with final action possible in mid-1989.

Halprin said the proposal, if adopted, would require the FCC to increase its "border patrol" regulation to ensure that the carriers do not subsidize their unregulated services with revenue from their regulated telephone service.

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NEWS

Fibronics to base LAN on ANSI compatibility standard

Network focus to be expansion, not speed

By Stanley Gibson

HYANNIS, Mass. — Fibronics International, Inc. is expected to introduce in January a 10Mbps bit/sec. fiber-optic token-ring network, likely based on the Fiber Distributed Data Interface (FDDI) standard.

"The idea is less one of speed than of standard," said Fibronics Chairman Morris Weinberg. Present networks that carry data at high speeds but are built around proprietary architectures can limit the ability of a network to expand. However, the use of a standard will enable the network to connect equipment from many vendors, according to Weinberg.

"Compatibility is the key to success in the local-area network industry," said John Kessler, president of Kessler Marketing Intelligence in Newport, R.I. "Now there are variations that don't permit complete interchangeability. The movement toward standards is very important," he added.

ANSI casting expected

Weinberg declined to name the specific standard on which the new work is based, but said his experts final casting of the standard to American National Standards Institute (ANSI) to take place within the next several months. "No one has built one conforming to this standard before," he declared.

Industry analyst David Terrie, president of Newport Consulting in Boston, pinpointed ANSI's FDDI standard as the only probable one on which the network could be based.

Weinberg said the product's first customer, whom he declined to name, will receive the network in February. Weinberg termed the customer a large data communications company that will spend about \$1 million for the network it will use to transmit color graphics. Beta tests on the product were carried out by Fibronics internally, Weinberg said.

Hedging on VLSI

The price per node for the first customer will be between \$50,000 and \$70,000. Weinberg said he aims to bring this price down to about \$20,000 later in 1987 through the use of very large-scale integration (VLSI) technology. He said he does not want to commit to a VLSI chip design before the ANSI standard is formally set.

Terrie said the network's relatively high price would not be a deterrent if a user could gain a real advantage. "It's not a price-sensitive market," he said.

Weinberg said a key role for the network will be as a supernetwork, or backbone, connecting numerous subnetworks of such established standards as Ethernet and IBM's Token-Ring Network. Although interfaces to these networks have not yet been established by Fibronics, they will be in 1987, according to Weinberg. He said the connection to IBM's Token-Ring would include links to both the current system and the anticipated 10Mbps version that many expect in 1987.

"This will enable people to construct a tiered network," Terrie said. "The real value is that with the standards, you can have communication between a variety of systems," he added.

The interface technology will be developed by Spartacus Computers, Inc., a unit of Fibronics based in Lowell, Mass., Weinberg said.

Noting Spartacus' use of Transmission Control Protocol/Internet Protocol (TCP/IP) in its software

products, Terrie speculated that the network product would implement the popular protocol. He suggested the use of TCP/IP will make it easy to move to a fully International Standards Organization (ISO)-compatible interface when those standards are established.

TCP/IP is the closest thing to ISO. It will be easy to migrate," says the FDDI ANSI standard uses only the first two ISO layers, Terrie pointed out.

'The network issue is less one of speed than of standards.'

— Morris Weinberg
Fibronics International, Inc.

Weinberg said he has high hopes of selling to customers such as large banks and the U.S. Department of Defense. The network can theoretically be expanded to 1,000 nodes with little degradation in performance, thanks to its token-ring design, he said.

Because of the new network's anticipated use on a corporatewide basis, Weinberg said Fibronics would study the feasibility of connecting to IBM's Netview network management system.

He also said he "will have to deal with" possibly paying patent royalties to Olof Soderblom, who holds patents on a token-ring networking scheme.

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VIEWPOINT

EDITORIAL

Of laws and sausage

Political pundits are fond of saying there are two things one never wants to watch being made: Sausage in one legislature and the other. The unsavory mechanics of the legislative process became apparent last week, as a previously overlooked section of the 1986 Tax Reform Act was finally exposed to press scrutiny.

Section 1706 eliminates the independent contractor designation for technical specialists — engineers, designers, systems analysts and the like — and subjects them to common-law standards for determining who is an employee. Under such standards, most of them would lose their independent status and the tax advantages that go with it. Meanwhile, nontechnical free-lancers, such as writers and artists, retain their independent status.

Naturally, there is consternation within the ranks of technical service workers, the firms that broker their services, and the companies that hire them. They charge the provision unfairly singles out technical specialists, while restricting the flexibility of employers to use workers efficiently.

Arguing for the provision are larger computer consulting firms who work through employees; not surprisingly, they view contract workers as unfair competition. Although the actual sequence of events remains murky, it now appears that the chief impetus for the provision came from such firms, who aggressively lobbied Congress's Joint Committee on Taxation at just the moment legislators were searching for ways to generate additional tax revenue.

Now the provision's chief backer, Sen. Daniel Moynihan (D-N.Y.), is calling for a special task force to develop guidelines for applying Section 1706, a tacit admission that the provision never received appropriate scrutiny before passage.

Whatever the merits of the arguments for and against Section 1706, one thing is clear: The arguments deserve a fair, full discussion with all segments of the computer industry. After-all-the-fact, however, is better than none at all, but it really takes the place of an airing of the issues before the appropriate congressional body prior to a bill's passage. This is messy lawmaking, indeed.

Then and now

As another year's worth of memos and budgets, of new products and new technologies, of decisions and negotiations goes by, the question occurs to many a manager: Where is this job taking me? It is impossible to see ahead 20 or 30 years, but we can look back for perspective, as does this week's *In Depth*, "Jacks of all trades," a tale of DP veterans who helped create the profession.

These pioneers learned harsh lessons as the 1980s unfolded. Many lost out as their jobs changed dramatically. It used to be possible to be both technical and department head. Such managers were promoted by technical skill and longevity. Today, management knowledge and the savvy to keep pace with rapid change are the new keys to success.

Managers can look back wistfully at simpler days. But if the tales of these industry veterans mean anything, they illustrate how much constant change has become a major part of today's MIS environment.



LETTERS TO THE EDITOR

Limiting worker information abuse

Ron Schneiderman's article, "Employee productivity: Big Brother is monitoring you" [CW, Nov. 10], misses the heart of the matter in dismissing worker objections to computer monitoring.

Computer operators being electronically surveilled are much different from sales representatives, who fill out reports, or football players coached from the sidelines, as Schneiderman disingenuously draws the comparison.

With the computer, workers can be watched every fraction of every second of their workday. More information, in greater detail, can be collected than ever before. The potential for abuse is obvious.

Schneiderman notes that the product of monitoring is information, and he raises important questions: How important is the information? How relevant is it? Does it truly reveal the quality of the work being performed?

In far too many cases, managers collect far too much information, without the employee knowing what is being collected or how it is to be used. To limit these potential abuses, 9 to 6, the National Association of Working Women, suggests the following:

- Ban the use of subliminal software programs.
- Notify workers when auditory, visual or computer surveillance occurs.
- Allow employees complete access to their personnel files and provide them with information on how the data is collected and used.
- Establish a grievance procedure so employees can appeal incorrect data, since the computer is not always right.

In order to start out with the best foot forward, statistics should be collected by work group, rather than by individual worker. Productivity standards or work quotas should be set with employee input to reflect system problems, such as downtime and response lags, quality of service and work load variability.

These are just a few ways to prevent some of the worst abuses and give employees a minimum of protection until, in Schneiderman's words, employers can "figure out what information is really worth and can evaluate its timeliness."

Karen Harschbaum
Executive Director

9 to 6
National Association of Working Women
Cleveland

How to end the VAX hiring wars

In response to your article "VAX boom triggers hiring war" [CW, Dec. 11], I would like to point out a reason for the shortage of experienced VAX programmers. It is not so much Digital Equipment Corp. hiring them out of the market or pushing their system extremely well; it is rather that, in Washington, D.C., at least, no firm is willing to pay the money to train new people. The general philosophy of hiring in this market is to raid competitors to staff a short term, one-time contract and then start all over again.

What is needed, unfortunately, is for Congress to get into the middle of the fray and amend the current Fair Labor Standards Act to require that X-number of trainees will be hired for a given Y-dollar contract that employs a Z-volume of people. While not one Beltway Bandit, as they are nicknamed locally, would ever willingly accept such standards, the plan does have its merits.

For one thing, it would provide the marketplace with enough trained personnel to meet market needs without cutthroat hiring tactics. Second, it would encourage colleges and universities to properly prepare young men and women for the current demand. And third, the plan would provide a guarantee to future computer industry professionals that there will be entry-level job positions available to them.

It isn't an easy pill to swallow, but given the fact that most local consulting firms seemingly refuse to hire any entry-level programmers, it may be a necessary one to take. In the end, it will be the cheap, dirty and, in a way, deeply damaging hiring practices that may bring on such legislation. I personally hope the Beltway Bandits learn there is more to life than short-term gross profits from over-inflated government contracts.

Kevin P. Kildepatrick
Fairfax, Va.

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VIEWPOINT

Friendly vs. forward-looking: the Mac and AT square off

Under its navy blue dust cover, my Kaypro Corp. II sleeps on. Every once in a while, when I need an old file, I'll power it up, insert floppies, enter commands and wait patiently while the disk drives grind away.

I still have a soft spot in my heart for the Kaypro II. But when I walk across the office and hit the switch on my IBM Personal Computer AT, the whirr of the disk drive starting up is music to my ears. The speed, the power, the convenience of the hard disk, the variety and usefulness of the software — all this means the Kaypro, despite my sentimental attachment, is off for that big computer room in the sky.

But I warn my AT not to be too smug. There is a pint-sized upstart from California that is beginning to draw a lot of attention from business users and has caught my eye as well.

Smitten posse

I'm referring, of course, to the Apple Computer, Inc. Macintosh. Specifically the Mac Plus. A typical reaction to the Mac is that of William Zuchmann, vice-president of Micro Bits International Data Corp., who occasionally writes the Micro Bits column for this

publication. He has been smitten by MacBug. His Dec. 1 column was titled "Time to Take the Mac Seriously," and he followed that up on Dec. 8 with a paean to Excel, Microsoft Corp.'s superb spreadsheet produced specifically for the Mac.

One of my clients, an offices in which the client's week-long crusade holds an AT, XT or equivalent. Microsoft's MS-DOS is the order of the day. However, there is one renegade in the bunch. The marketing director, a noncomputer type who came to the firm from the world of book publishing, sits in his office making his Macintosh smoke. When I mentioned I had never really used a Mac before, he sat me down for an on-the-spot demo. He's an enthusiast, and, when we finished, I could see why.

Like most Mac users I've talked to, he loves the icon-based graphics interface. It's friendly, graphical and allows you to move into the machine and do useful work without touching the keyboard. You don't have to attend a score of programming courses in order to be up and running. There's all the software you'll ever need, he said, and, like Zuchmann, he is entranced with Excel.

My marketing friend is an organized man. He likes the fact that the Mac sits neatly on the corner of his

desk, leaving plenty of space for the paper that ebbs and flows across his work space during the day. Obviously, he would not be happy with the sprawling footprint of an AT, which tends to monopolize any flat surface it encounters.

But if you are beginning to suspect that I'm about to advocate beating your ATs into ploughshares and filling up your offices with Macs, read on.

The same day, at the same client's office, flushed with enthusiasm after my Mac Demo, I happened to talk with another of the employees. This man is a PC whiz. He scrambles around DOS with the dexterity of Horowitz playing Chopin. When I began talking about perhaps buying myself a Mac for Christmas, he sat me down and delivered the following sobering lecture.

The big reason for any business user to choose a PC over the Mac, and he, is upward growth. He cited an application where the Mac is an obvious choice: a design house with high volumes of graphics and graphic design. But, he cautioned, if they wanted to upgrade the system to do more sophisticated work, such as computer-aided design, they're stuck. The fly in the ointment is the closed operating system.

Just over the horizon is ADOS, or

DOS 5, he said. This, coupled with the increasing flurry of activity surrounding the 286 and 386 chips, will spawn an untold number of exciting applications for the PC world.

And how about multitasking? Will Apple support Unix? No word from Apple yet, was his comment.

Mac-machine interface

One of the Mac's biggest advantages is its friendly graphic interface, he admitted. IBM has a long way to go to match it, and the man-machine interface is not something they're good at. But it will happen, and, in a few years, most DOS systems will have a graphic interface option. Also, the new graphics chips from Intel Corp. and Texas Instruments, Inc. mean more exciting and powerful graphics applications for the PC marketplace, along with faster response times — down in the 0.16-second range. The DOS world is just more nimble and more varied, he concluded.

At this writing, the marketing manager still uses and loves his Mac and the PC expert continues to perform tests of legibility on his AT.

As I scanned the ads in this morning's paper, I noticed the ads for the Mac Plus continue to inch downward. I thought about the conversations I had with those two avid computer users. Well, I told myself, maybe I won't get a Mac this Christmas.

But in the spring . . . who can tell?



By JOHN L. KIRKLEY

... Not a computer was stirring, not even a mouse

Taking a lesson from today's leading corporations, one of the world's oldest manufacturers and distributors of children's toys has brought in high-technology assistance to handle growing challenges of the holiday season.

Established well over a century ago, North Pole Toy Works, Inc. (NPTW) specializes in custom order, manufacture, and delivery of children's playthings, particularly targeted at the winter solution season. Famed for its accurate attention to customer interests and qualifications, the organization today serves children all over the world.

Changing times meant trouble for the NPTW, however.

"Between the Baby Boomers' kids, the increased diversification of toy lines and availability changes in our supplier environment, our staff was flat out," reports Mr. Kris "Pops" Kringle, founder and chief executive officer of NPTW.

Personal relationship

"We had materials and inventory crises. We'd barely finished one year before the next one was on us. But worse than all, I could see us beginning to lose that personal relationship

with customers that has been our hallmark."

"That's when I realized we aren't really in the toy business," Kringle says. "We have to know what toys are popular for every country, age group. We have hundreds of millions of kids to keep track of — their current requests and conduct during the year. We need to translate these requests into materials orders, pick lists, manufacturing schedules, storage inventories and delivery routings. And it all has to be carefully timed to come together on a single night."

"The answer was information management technology. In some ways we were lucky," Kringle notes. "By waiting as long as we did, we were able to leapfrog directly into some very capable, comprehensive technologies that would have been unthinkable even a few years ago."

The heart of North Pole's DP/MIS facility is the mainframe residing in the back room of this gigantic manufacturing and distribution center. "We had one advantage over most outfittes: Where we're located, cooling facilities are never a problem," Kringle chuckles.

The mainframe houses the massive data bases containing information on all of the children around the

world served by NPTW. "We're using relational data bases to hold current and historical data, addresses, ages, interests, previous requests, naughty/nice lists, and other key information," Kringle explains. "We're archiving data in optical jukeboxes with tape backup. We maintain separate data bases of toys and can cross-map by toy name, type, size and size group."

Working from these data bases, along with data from media consultants, NPTW's MIS department begins by late January to predict the coming end-of-year inventory needs.

As the year progresses, the master order list grows increasingly specific and accurate.

The master order list is exploded using Manufacturing Resource Planning II application software to generate material orders, production scheduling and routings, down to the shop floor and pick-list level. To reduce storage and capital overhead, Kringle is using just-in-time inventories, order techniques. The mega-mainframe system connects to mouse- and menu-driven workstations and display terminals throughout the factory, using proprietary Santa's Networking Architecture (SNA) communications links.

As each toy is completed, a barcode label is attached, and it is sent

to NPTW's intelligent warehouse Electronic Loading Facility (ELF), via a self-guided rail sled system called the Elfbus.

As C-Day approaches, delivery routes are calculated. The final drop schedules are written on floppy disks for playback in on-board guidance modules mounted in the sleds. "It looks like it's all going to work like a charm," Kringle predicts. "You don't know what a pleasure it is not to have to check those lists twice anymore."

Potential efficiencies

With the first round of computerization under his capacious belt, Kringle says this is only the beginning. "We've still got lots of opportunities for improvement," he observes. "With the increasing number of computers in the home, there's a lot of potential efficiencies available by extending our on-line activities out to our customers."

"We're also looking at some really exciting possibilities, like using AI techniques for everything from forecasting to personal profile checking. And we're hoping to tie our delivery vehicles via satellite and cellular links for real-time guidance and correction. LED-nosed reindeer, you might say."

"It's been a long haul, but it's been worth it," Kringle concludes. "And now I understand why we've had so many requests for computers lately —

QUEST OPINION

By DANIEL P. DERN

A Massachusetts-based marketing, technical and science-fiction writer; Dern hopes to find a home computer in his stocking.

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MICROCOMPUTERS



MICRO BITS
William Zachmann

Enhanced graphics are Vega's draw

One of the most visible benefits to users of the open architecture of IBM and compatible personal computers has been the intense competition among hardware suppliers. While it not for open architecture, prices would be far higher and products far less innovative than they are.

The Vega Deluxe graphics adapter from Video-7, Inc. in Milpitas, Calif., is a perfect example of the fruits of this competition. Video-7 was among the first to take advantage of the Chipset Technologies, Inc. Enhanced Graphics Adapter (EGA) chip set, based on the IBM EGA standard, to build a short-slot EGA-compatible board. Vega-7 is also one of the first board vendors to make a heavy commitment to surface-mount technology. Under its own label the company has established itself as a key supplier of high-quality graphics boards.

The Vega Deluxe represents another innovative step forward. It provides the ability to support all four major graphics adapter standards: IBM's Monochrome Graphics Adapter, Color Graphics Adapter and EGA as well as Hercules Computer Technology, Inc.'s Hercules Graphics Card.

The Vega Deluxe does more than that, however. Its distinguishing feature is a proprietary EGA Integrator chip that supports the NEC Corp. Multisynch Monitor and similar devices. This support makes it possible to obtain higher resolution graphics than the EGA's 640 by 350-pixel resolution.

With multisync monitors like the NEC Multisynch, the Vega Deluxe pro-

See VEGA page 22

Zachmann is vice-president of research at International Data Corp.

Microsoft delay bemoaned

Users say costly 80286s weren't worth investment

By Eddy Goldberg

While micros based on Intel Corp.'s 80386 chip are available now, many corporate users still await the operating system from Microsoft Corp. Able to utilize the full power of the 80286, the censor will not be available until late next year. Major applications for that operating system are expected to lag behind its availability by six to nine months.

"When the Intel 80286 machines came out, we made the assumption that a DOS would be available before long to utilize them completely and obtain the benefits of that processor. So we've been buying 286s for more than a year as a standard product and spent a lot more on them than we would have on the 8088 machines," says C. L. Hodges, supervisor of the Personal Computer Services Center at Chevron Corp. in San Ramon, Calif.

"Meanwhile, we get very little benefit out of that extra expenditure, and the thought of people who have on those machines are not much less productive because they can't use the capabilities that would have been there in the new DOS," he adds.

And until Microsoft's MS-DOS 5.0 comes along, "there's no other use for the 286 right now other than it runs faster than the 8088," says a consulting engineer at a large Western bank.

Of his users, Hodges says, "They can't address more memory, they can't have multitasking capabilities and whatever other features might come along with the new DOS."

If one takes this situation and multiplies it across the country, Hodges said, the result is a large number of underutilized IBM Personal Computer AT-class machines.

"This is a big bill that somebody is having to pay because we haven't had a DOS to use these machines, and I feel a little irate, really," he says. "But I think we're

the biggest victims of all — the users. We paid money for these machines, [we're] not getting what we paid for, and we have a right to be irate," Hodges adds.

Although Hodges used to blame Microsoft for the delay, he says he is now unsure, adding that he believes Microsoft may be caught up in "having to trudge around from one IBM division to another." He says he has begun to view Microsoft somewhat as a victim, rather than as a villain.

"I don't know exactly who's to blame, but somebody ought to fix it, and having to wait until fall of next year is a travesty," he says. "I think it's to the point where it has a measurable effect on the productivity of American business. I think it's really serious."

One corporate user who asked not to be identified says his company is standardizing around 286-class machines. But he says he thinks senior management was hornswoggled. "It's the old 'peek under the kimono trick' that IBM and Microsoft are adept at playing . . . It's just like a con artist with a pigeon."

— Anonymous corporate user

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NEW THIS WEEK

■ Barrington Systems enhances its Clarion programming language

■ For more on this and other new products, see pp. 45-47.

INSTANT ANALYSIS

"What IBM does in concert with a DOS 286 and new machines based around the 286 will set the stage for what kind of software we can write for the next 10 years."

— Edward M. Eber Jr., chairman and chief executive officer of Ashton-Tate

Cummings does not comment on Lotus lawsuit dismissal

Problem is user error, not flaw, Lotus says

By Douglas Barney

CAMBRIDGE, Mass. — Lotus Development Corp. recently announced that James A. Cummings, Inc. has dropped the lawsuit that it had filed against Lotus.

"If you are familiar with the United States Football League case, the USFL got one dollar in damages, which was trebled to \$3. That is \$3 more than Cummings got," commented Jim P. Manzi, Lotus chairman and president, at a meeting of analysts and investors at a First Boston Corp. high-technology conference.

Neither Cummings nor the firm's

counsel received any payment from Lotus as a result of the lawsuit dismissed.

Symphony for underdog

The suit charged that a flaw in Lotus' Symphony-integrated program caused Cummings, a Florida-based construction firm, to underbid a construction contract by \$260,000.

Lotus maintained that Symphony had no such flaw and argued that it was user error that created the problem.

According to the attorney representing Lotus in the case, the user added a new figure to a spreadsheet within Symphony that was outside the range specified by the user.

"It was not within the range, and that was their problem. If they had

inserted it within the range, it would have automatically been included in the calculation," said Hank Gutman, an attorney with O'Sullivan, Gravel & Karabell in New York.

"They did not take into account the fact that when you insert a new line, it shifts everything down, including the formulas and accordingly, including the range," Gutman said.

Symphony remains unchanged

No changes have been made to Symphony as a result of the lawsuit.

"The feature of the Symphony program which the Cummings employee tripped over is a feature that is not by any stretch of anyone's imagination a defect," Gutman said. "It is an intentional design feature of

the program which is common not only to Symphony, but 1-2-3 and every other spreadsheet that any of us have ever encountered."

Cummings President James A. Cummings, who spoke through his secretary, declined to comment on the case.

Condition of silence

In fact, one stipulation of the dismissal was that Cummings would not comment, according to Gutman.

"To dismiss a lawsuit at this stage requires the consent of both sides. One of the conditions of our agreeing to the dismissal was that it include this provision precluding them from talking," Gutman said.

According to Gutman, Cummings is still using Symphony.

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100

MICROCOMPUTERS

Vega graphics enhanced

From page 1B

video two additional resolutions of 752- by 410-pixel resolution — at a 25-KHz scan rate — and 640- by 480-pixel resolution at 29.4 KHz. These higher resolution modes can be very helpful in graphics-intensive applications.

You cannot, unfortunately, use these higher resolution modes unless software is written to take advantage of them. The Vega Deluxe, however, comes with software drivers for Microsoft Corp. Windows.

Installing the high-resolution drivers for Windows proves to be easy and straightforward. The 752- by 410-pixel resolution mode seems to alter the aspect ratio for some Windows applications. Once you've seen the

640- by 480-pixel resolution in action, however, you'll never want to go back to the resolution of the EGA again.

But software that does not run under Windows, which, today, means most software — cannot take advantage of the higher resolution modes of the Vega Deluxe. Software developers will need to incorporate drivers before these modes can be used.

The \$599 list price on the Vega Deluxe is only \$100

more than the older Vega board, so the additional capability comes at a modest incremental cost. And software support for the Vega Deluxe at this resolution graphics is certain to grow steadily with time.

More sophisticated users can develop their own software, of course, and can provide their own support for the high-resolution modes of the Vega Deluxe. Source code and detailed implementation instructions are available at

no cost from Video-7.

Like the earlier Vega board, the Vega Deluxe comes with software that can be used to switch among different graphics modes. It also has a screen save feature that will turn the screen off after a specified interval if keyboard input has not been received. This prevents burn-in on the screen phosphors.

Dip switches are accessible from behind the system to configure the Vega Deluxe for the appropriate display and secondary adapter display, if attached, and to enable or disable emulation modes. A larger toggle switch sets the monitor type.

The standard EGA feature connector and light-pen port are also included. This ensures full compatibility with all the connectivity features of the EGA.

Video-7 fully guarantees the Vega Deluxe for two years. In addition, the company provides an innovative guarantee that the Vega Deluxe will be competitive with all software written for any of the four graphics standards supported. Under its Compatibility Guaranteed Program, Vega-7 offers a full money-back guarantee for any compatibility problems that cannot be satisfactorily resolved within 30 days.

The movement toward higher resolution graphics, not only in computer-aided design/manufacturing and other specialized applications but in the broad business use of personal computers, is inevitable.

Vega-7's Vega Deluxe is a solid product with a lot to offer for users who want the flexibility of handling all the standard graphics modes. It brings with it the ability to take advantage of even higher resolution graphics modes as well.

Microsoft delay angers

From page 19

has 1,000 microcomputers. Hodges acknowledges that there are gains from the 286 machines beyond speed, most notably their 16-bit data path and the 360K hard disk. Despite the greater speed, Hodges says the 286s were not worth the added cost. "When you think about all the money spent on the 286s in the hope of getting that advantage, they could have gotten that same advantage with a crystal change — put a speed-up crystal in the 8088 and gotten as much benefit as we've gotten out of the 286 machine," Hodges concludes.

Computerworld staff member David Bright contributed to this report.



SOFTWARE & SERVICES



SOFT TALK
Charles Babcock

Clips from the cutting room

As 1986 draws to a close, several comments come to mind that never fell within the confines of Computerworld's weekly news columns. Let them slip away without seeing the light of day, here are a few selections from the news we see fit to print at the last minute:

IBM's Cross System Product (CSP) is stirring interest, but one dare makes a final judgment. John Landry, in a review of ADABAS/O software development technology, said CSP/Query "mixes flashes of brilliance with traditional IBM head-scratching."

In the middle of the year, a special commission investigating the system logjam in the New Jersey Department of Motor Vehicles concluded that Price Waterhouse & Co. misused a fourth-generation language in response to political pressures.

The language was ideal, an Applied Data Research, Inc. (ADR) product that has won praise in other quarters, and the supplier attempted to warn Price Waterhouse not to do what it was about to do. ADR offered instruction in Cobol to the Big Eight accounting firm's employees, saying it would be needed for transaction processing.

At September 1984 breakfest meeting between ADR representatives and Price Waterhouse managers to discuss ideal's role in the project, ADR Vice-President Joseph W. Parrelly told Price Waterhouse managers that if they intended to use ideal exclusively, "This meeting should end right now," the commission report said.

Babcock is Computerworld's senior editor, software & services.

Advertisement

Oracle launches ALLIANCE program for software VARs

Oracle Corp., supplier of the ORACLE distributed relational DBMS and application development tools, has announced a new program for software value-added resellers dubbed the Oracle ALLIANCE program. The program will offer VARs faster delivery cycles and shorter time-to-market for VARs who build or convert their applications to use Oracle's products.

According to Larry Harman, Oracle's Director of the VAR program, "We offer major business benefits to VARs who choose to use ORACLE with their products. Chief among these benefits is ORACLE's portability and the portability of ORACLE-based applications, allowing applications and data to be shared among different machines. Oracle also provides the link software to exchange database information among the different machines."

Broader VAR Markets

ORACLE runs on the widest array of hardware: IBM mainframes under MVS and VME, most version's minis, under both proprietary and UNIX operating systems, and PCs under MS-DOS. Oracle also developed SQL/RT, marketed by IBM on the RT PC.

Harman states, "Only with ORACLE can an application developer produce software on one system and inherit a vast market of users of multiple vendors' hardware. Basically, we let our software VARs do blindfold sailing."

COMPUTERWORLD

Cobol measurement tool out

Allows quantification of programs' quality

By Charles Babcock

SALEM, Mass. — Language Technology Inc. has introduced a Cobol-quality measurement tool said to provide a method of assessing a program's structure and testability.

The tool, called Inspector, employs McCabe Graph Theory mathematics, also known as McCabe's metrics, which software productivity expert T. Capers Jones calls an accurate measure of a program's complexity and testability, said Language Technology Chairman Eric Bush.

The measurement tool analyzes an IBM Cobol program, deriving a set of measurements placed in data analysis files. It then creates reports based on those files. Bush says, "The analysis determines how well-structured the program is, yielding a quantitative assessment that can be compared from program to program."

A program that has undergone one of

the standard restructuring techniques will have a McCabe "essential complexity" of one; unstructured programs will have a complexity that is greater than one, Bush said.

A second McCabe measure is cyclomatic complexity, an indication of how difficult a program is to test. "In a 50-line Fortran program with 25 IF statements, you have 33.5 million potential paths through it. You can't build 33.5 million test cases," Bush noted.

When the potential number of paths through a program rises to more than 10, "the error rate goes up steeply. There's something about the human psyche that loses comprehension when the possibilities go above 10," Bush said.

By automating these two measurements, an MIS shop can obtain standard reports "on the level of complexity — how much recursive code, how many premature exits and how difficult the logic flow is — in our programs," said Larry L. Cohn. Cohn is manager of Medicare Systems at Transamerica Occidental Life Insurance

See COBOL page 24

SOFTWARE NOTES

IBM market deal lacks silver lining

Not all joint marketing agreements with IBM end in a pot of gold for a lucky software company. Artificial Intelligence Corp. in Waltham, Mass., will end its joint marketing agreement on its intelligent natural-language product at the end of this month. Artificial Intelligence officials said the firm's sales force and IBM's sales force frequently tripped over each other as they presented Intellect to the same customers.

Callier Scientific Systems Corp. in Santa Barbara, Calif., says it has a compiler that uses expert system techniques to optimize execution of a For-

See NOTES page 24

By Merv Adrian

User groups are greeting the recent purchase of Ramis II, the information center-oriented fourth-generation language from Martin Marietta Data Systems, Inc. by On-Line Software International, Inc. in Fort Lee, N.J., with guarded optimism.

Rosalie Galazka, president of Forum East, a prominent Ramis II users organization, says she views the acquisition as "an opportunity to things to improve. We have already met with the new management team and we think we'll work with them very well."

On-Line officials say they consider the group's feedback valuable and have organized joint committees to discuss future directions of the product.

See RAMIS page 24

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Ramis II users assay purchase

By Merv Adrian

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See RAMIS page 24

Advertisement

"Blindfold Setting"

The company described "blindfold setting" as the ability of a VAR's salesman to walk into an end-user site blindfolded and say, "I don't know what types of hardware you're using, or how many types there are, but my applications run on all of them."

Harman points out that VARs have a tough decision to make concerning what software to implement on. With ORACLE, the decision needn't be hard. Software VARs who establish a niche in a particular vendor's model line can take advantage of ORACLE's portability to sell in other hardware environments.

Shorter Time To Market

The company also cited the high level of productivity offered to VARs by Oracle's broad range of application tools, including a forms system, integrated spreadsheet, graphics and other tools. These tools reduce development and implementation times and increase efficiencies that translate into shorter time-to-market and lower costs.

And, Harman adds, "ORACLE is the most complete and mature DBMS on the market. SQL is becoming a national standard, so developing applications with an IBM-compatible, portable DBMS makes business sense in both private-sector and public-sector markets."

Harman concludes, "Generous discounts plus support, training and co-marketing combine to make the Alliance program an outstanding opportunity for software VARs."

Oracle Corporation, founded in 1977, builds and markets the Oracle distributed relational DBMS, 4GL and DSS tools. ORACLE was the first commercial SQL-language DBMS, and is compatible with IBM's DB2 and SQL/DS DBMSs.

ORACLE provides a standard software environment across a wide range of computers and operating systems, including IBM and compatibles, DEC, DG, ATT, HP, Stratus, IBM, Apollo and many others. IBM's OS/2, ORACLE runs on MVS and VM/CMS, DEC's VAX/VMS, DG's AOS/VS among others, as well as with UNIX system.

All versions of ORACLE, from the mainframe to the PC implementation, are identical. ORACLE is the only relational DBMS which provides the complete portability of data and applications across a wide variety of systems. Oracle's SQL*Server implementation links dissimilar systems running ORACLE.

Oracle Corporation markets its products worldwide through 90 direct sales offices, 11 distribution and the Authorized Oracle Dealer network. In addition, ORACLE is sold by numerous hardware manufacturers, including IBM, Honeywell, Sperry, Sun and Prime.

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For additional information, contact Larry Harman, Director, VAR Marketing, Oracle Corporation, 20 Davis Drive, Belmont, CA 94002 or call 800-345-DBMS

NEW THIS WEEK

■ Symbolics introduces its CommonLISP Cross-Compiler

■ For more on this and other new products, see pp. 45-47.

INSTANT ANALYSIS

"What's a fourth-generation language? It's a point in time, not something you can really define."

— James Deyer, senior research associate, Digital Consulting, Inc.

SOFTWARE & SERVICES

Ramis II users assay purchase

From page 23

On-Line has been an IBM CICS mainframe system utilities supplier since it was founded in 1969. In addition, it offers two micro-to-mainframe products, Omnilink and Freeline.

It markets these products with a telemarketing staff and, until the Ramis II acquisition, had no direct sales force.

"Obviously, we wouldn't have taken on Ramis, which has been losing money, if we didn't think it could be turned around," says Susan Leuchinger, On-Line's vice-president for information systems.

Loren D. Hurwitz was, until shortly before the sale of Ramis, product manager for the personal computer-based Ramis Workstation product family.

He left the firm in part because he felt "the product was not being adequately marketed. We had made major advances in Ramis in the last year or two and the response from our users was excellent, but we weren't connecting with new sales," he explains.

Hurwitz has formed and is president of Relational Software Solutions, Inc. in Princeton, N.J.

A proven record

"What I've heard from my clients so far," Hurwitz adds, "is relief that Ramis has been bought by a software house with a proven record."

"They'll have to go a long way to

catch up," says Jeff Bernknopf, president of Fourgen Information Systems in Old Bridge, N.J. Bernknopf has published several studies of the fourth-generation language market.

"Ramis lost the lead to Information Builders, Inc.'s Focus sometime in 1983 or '84, and that lead has been extended. However, with their CICS expertise, On-Line could really address the efficiency issue and go head-to-head with IBM," he comments.

At this point there are no fourth-generation languages that run well under CICS, Bernknopf adds.

Read/write interface

Leuchinger indicates development of the main product will be continued in several already established projects, the most important of

which is the IBM DB2 read/write interface.

The repackaging of the product is another priority. "At the present time, Ramis is sold as a large number of separate modular products," Leuchinger notes.

"We'd like to get away from that and supply a complete product which contains all the core functions all in one place. This will simplify distribution, development and maintenance."

Another new approach will be the introduction of Ramis Workstation, a bundling of a series of end-user tools into a cohesive whole.

Adrian is chairman of the micro-to-mainframe Special Interest Group of the New York PC Users Group and senior programmer/analyst at Shearson Lehman Brothers, Inc.

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Notes: Wang to lower VS rates

From page 23

tran program on its parallel processor, the Culler PSC. On a Livermore Labs benchmark, the compiler yielded a 50% performance boost, Culler spokesman claims.

Wang Laboratories, Inc. is offering software development services for applications to run on its VS minis at rates lower than those generally available in the U.S. by making use of Datomatics Consultants Ltd. in Bombay, India. Low-cost software produced in Bombay will be supported by a third firm, Information Management Consultants, Inc. in Falls Church, Va., Wang spokesman said.

Videodata, Inc. in New York says its IBM CICS application, Rex 25, can give an IBM 3270 terminal access to external ASCII information sources, such as the Dow Jones News Retrieval and Dialog. Internal corporate data bases can also be accessed with the product, spokesman claims.

Infofdata Systems, Inc. has received a \$1.9 million contract from the U.S. Army for a text data base management system for the Army Threat and Intelligence Production System of the Army Intelligence and Threat Analysis Center.

Executive Systems Corp. and Digital Equipment Corp. have signed a marketing agreement to promote Executive's financial planning and decision-support software.

Cobol tool released

From page 23

Corp. in Los Angeles.

Transamerica has purchased Inspector and is about to install it, Cohn said. The firm has a library of more than 1,000 programs.

"I need to know for a system-to-system basis what shape those systems are in," Cohn said.

Inspector is available for \$29,500 to run under either IBM's MVS or VM.



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COMMUNICATIONS



DATA STREAM
Elizabeth Howlett

Look before you link

The Christmas spirit has yet to visit local-area network (LAN) software vendor Novell, Inc., according to one extremely irate value-added reseller (VAR).

Computer Education & Consulting Group, Inc. (CECG), an Old Bridge, N.J.-based VAR, recently purchased Novell's Netware '86 Version 2.0A for its client, Revision, Inc. CECG is in the process of evaluating a number of IBM Personal Computer LAN products for the cosmetics company.

The Novell network was purchased to fill a specific set of needs, according to CECG President Mitchell Geier. Revision wanted software that turned an IBM PC into a nondedicated file server that could also run PC applications. Novell sold CECG, Revision's agent, a copy of Netware '86 as a nondedicated file server, Geier says.

But when the VAR actually tested the software as a network server with a 200M-byte disk, it found that there were actually no rooms left in main memory for additional applications after file server operation such as file caching, allocation tables and directory were taken care of. "We couldn't even boot the program up as a nondedicated server," Geier says.

When Geier called up Novell's support center in New York, the vendor informed him that Netware 286 supports extended memory, which would leave enough room in random-access memory to support PC applications. "I said, 'Fine, but Netware 286 is not a

See LOOK page 28

Howlett is Computerworld's senior editor, communications.

MCI leases part of fiber net

By Elizabeth Howlett

To avoid falling behind competitors in the race to implement fiber-optic networking, MCI Communications Corp. has decided to lease, rather than build, its own Chicago-to-Los Angeles fiber-optic link. The Midwest-to-West Coast fiber-optic connection will be integrated with MCI-owned East Coast-to-Midwest fiber-optic lines to provide a computer-to-computer connection by January 1987, according to MCI spokesman John Houseman.

The leased-line portion of the network, which will handle up to 810M bit/sec., will be provided by Williams Telecommunications Co. in Tulsa, Okla. The financial terms of the agreement were not released. Williams Telecommunications is a member of the National Telecommunications Network consortium of regional fiber-optic

network providers.

MCI chose to lease a portion of its fiber network in order to get the capacity faster, according to company spokesman Gary Tobin. "A lot of fiber is available now for low cost," he said. MCI will lease the cable's entire capacity of 22 fiber pairs, although the company will initially only use three pairs to support its switch-to-switch high-speed connections, Tobin said.

Leasing the whole cable ensures that MCI can add capacity at need, he added. "It costs \$100,000 per mile to build and operate your own fiber-optic network with three pairs in use and only about \$10,000 per mile to go to 19-pair capacity, whether you lease the lines or own them," Tobin said.

The economics of scale offered by fiber—

See PMT page 28

INSIDE

Datapoint rollouts enhance Arclnet/28

Tymnet adds to low and high ends of network switch line/28

NEW THIS WEEK

Digital Products offers a 30-port version of its Netcommander data exchange system

For more on this and other new products, see pp. 45-47.

INSTANT ANALYSIS

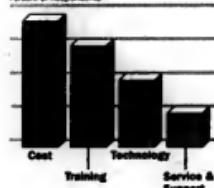
"Connectivity is the grain of sand in my shoe."

— William H. Anderson, senior vice-president of Information Systems Division, Prudential Bonds Securities

Internal software costs daunting potential MAP implementers

Manufacturing Automation Protocol Obstacles to implementation

Percent of Respondents*



* Multiple responses allowed.
Information provided by Advanced Manufacturing Research

CHICAGO — Fortune 500 companies are holding off on implementing Manufacturing Automation Protocol (MAP) networks until the standard offers more significant software engineering and savings, according to a recent study by Advanced Manufacturing Research (AMR).

Of 20 "check-signing decision makers" interviewed by the Chicago-based research firm last October, the majority only expect to make limited use of MAP in the next few years, AMR said. The respondents represented a variety of industries including automobile, aerospace, consumer appliance and electronics.

Only 10% of the companies surveyed expect to implement plantwide MAP networks by 1988, while 40% said they expect to implement MAP pilots in a limited capacity by 1988, AMR said. Thirty-five percent of the respondents said they do not expect to undertake plantwide MAP installations until the 1990s (see chart left), according to the study.

Approximately 75% of all respondents

See SOFTWARE page 28

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Issues of the Information Age:

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Data networking, as we see it, enables electronic systems in one or many locations to work together. It keeps people informed and in control, while the systems exchange, process and act on information automatically.

Computers within a data network process information, reordering it into useful form to solve problems.

In manufacturing, for example, data networking can tie together retail sales terminals, factory assembly lines and parts suppliers so seamlessly that nearly every order can be custom-made.

In service businesses, data networking can tailor every transaction to the needs of an individual—making it easier and more convenient to send, receive, and use all kinds of information. Computers within a data network will not only share information instantly, they'll act on it intelligently, reducing many of the hassles of everyday life.

THE NEED FOR OPEN ARCHITECTURE

The communications capability of a data network permits active connections among people, computers and machines. If the architecture of the network and the computers is open, many different kinds of robots and billing machines and input terminals and so on can work together. Then the network can do exactly what's needed.

Data networking requires AT&T to do three things. First, build links that are active and flexible, able to deliver information in the right form, to the right place, at the right time. Second, design and build computers that can both stand alone and

be efficiently networked. And third—and most important—design and engineer systems that enable customers to use AT&T computers and communications links in the most intelligent way for their specific needs.

At the same time, we will sell PBXes and terminals that are optimized for data networks, which include computers. In short, we will supply whatever is required to provide integrated solutions to our customers' needs—to enable them to move and manage information efficiently and effectively.

In a data network, no computer is an island; communications, computers and applications are the inextricable parts of a single system. AT&T envisions these systems beginning with business

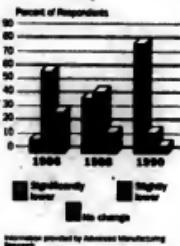
and rapidly extending to the rest of the world in the creation of Telecommunity—the ultimate merging of computers and communications that will allow people anywhere to handle information in any form as easily as they make phone calls today.



COMMUNICATIONS

Long-term benefits of MAP

Users expect MAP to cut communications software engineering costs



Software costs daunt users

From page 25

cited connection costs, in particular relating to internal software engineering, as a major disincentive to MAP network implementation — at least over the short term.

"The much emphasis has been placed on dropping hardware costs for communications boards," an electronics industry respondent told AMR. "Our main cost in building communications systems is in in-house software development." An appliance manufacturer told AMR that "hidden costs" — the software integration costs — can increase the initial hardware costs of any multivendor network system by a factor of 10.

Ninety percent of the respondents claimed that using currently available MAP protocols and products

would lower software development costs only slightly or not at all.

"Software integration is what's missing" for both MAP and computer-integrated manufacturing applications, AMR managing partner Anthony Frisia noted. Vendors are "doing harm through oversimplification in product presentation," leading customers to underestimate the amount of customized software that must be written before a factory communications system becomes viable, he said.

"Management thinks it will cost \$10,000 and then finds out a year later that the price is really half a million," Frisia added.

A spokesman from an industrial equipment manufacturer told AMR that his company does not "see MAP today offering us much of a break" in software development costs until the next version.

By 1988, 40% of the respondents expect MAP to have a significant im-

pact on real cost-to-connect; by 1990, 40% expect MAP to be a viable networking solution, AMR said.

Sixty percent of the respondents reported they see training and management-related issues as another impediment to MAP implementation.

A corporate planner at a conglomerate told AMR that "Even if a standard communications solution was available today, we'd still have a multiyear process of phasing it into most of our facilities." He added that regardless of the rate at which technology advances, his company will still have "deal with retrofitting existing processes and voter and management restraining issues." His company expects MAP to "meet our 1990 and beyond communications needs."

According to Frisia, MAP promises "more standardized tools that will provide a stepping stone to computer-integrated manufacturing. The big issue still is how big a commitment users are willing to make."

— Elizabeth Herwitt

Tymnet unveils low-end processor

By Elizabeth Herwitt

SAN JOSE, Calif. — Tymnet/McDonnell Douglas Network Systems Co. recently unveiled a low-end member of its Engine family of communications processors. For approximately one-third the cost of one-third the cost of the larger Mini Engine model, Micro Engine 4 offers the same functionality, though with fewer ports, Tymnet said.

Tymnet's Engine, Mini Engine and Micro Engine 4 switches support a variety of protocols including QLLC/T, X.25 packet-switching and asynchronous, as well as IBM Synchronous Network Architecture/Synchronous Data Link Control, 3270 Personal Computer and bisynchronous protocols. Other features include monitoring of terminal and host lines as well as inter-terminal links, pass-through communications and optional battery backup.

The Micro Engine 4 supports up to four asynchronous plus 10 synchronous port connections with 1M byte of main memory. It handles transmission speeds of up to 9.6K bit/sec. over asynchronous links and up to 19.2K bit/sec. over synchronous links. Both full- and half-duplex connections are supported. Integrated hardware and software diagnostics are standard features.

Part support

Priced at \$20,000 in single quantities, Micro Engine 4 supports up to 14 ports. The next largest model, Mini Engine, supports up to 64 ports. "A lot of our customers wanted the same functionality in a smaller system with fewer ports," said Tymnet product manager Jerry Messina.

Tymnet also introduced MAC III, the latest version of

a memory-access control board that is used with Mini Engines and Engines, but not with the Micro Engine 4. MAC III is said to increase character-per-second throughput from 50% to 100% over the earlier MAC II model's level. This "allows customers to get better performance on their existing units, eliminating the need to install a new Engine," Messina claimed.

The MAC III also incorporates board-level integration, which makes an extra slot available, enabling an Engine or Mini Engine to support up to 32 additional asynchronous ports or 16 synchronous ports, the company said. The single-unit price for a Mac III engine acceleration kit is \$24,000.

Both Micro Engine 4 and Mac III will be available in January, according to Tymnet.

Tools add to PC, LAN connections

By James A. Martin

SAN ANTONIO — Datacom Corp. last week announced products that allow Microsoft Corp.'s MS-DOS-based microcomputers and peripherals to connect more efficiently to its local-area network.

StarBuilder, a half-size network card and software package, provides the first direct connection between personal computers and ArcNet, Datapoint's proprietary token-ring network. The product also implements components of Datapoint's Vista-office office automation software packages on MS-DOS, enabling PC users to interface with the network through the Vista-guide user interface.

StarBuilder is also said to address security problems by enabling the MIB department to assign passwords and access levels to end users on the Arc network. The product will be available in March 1987. The cost is \$504 per user for 20 to 60 users, which includes both the network card and Vista software.

In addition, Datapoint announced Arc Virtual Circuit Services (VCS), an I/O connection channel said to provide direct Arcnet connections for up to 256 asynchronous devices and peripherals. Arc VCS allows devices to be added or removed from the network without system degradation or interruptions, Datapoint said.

If there is a moral to this story beyond "Let the buyer beware," it should probably be, "Before you open a package, make sure it's the one you want — especially when it comes to LAN software."

Part of MCI net leased

From page 25

optic cable are less likely to favor MCI than its big rival, AT&T, said Phil Stylian, research analyst at New York investment research and management firm Sanford C. Bernstein & Co.

While up-front costs are "a matter of distance, once you make the investment you have virtually unlimited capacity" — and that's an advantage to the big guy," Stylian said. AT&T, which is approximately 10 times the size of MCI, will have a fiber network that supports 1.7G bit/sec. by 1987, according to Stylian.

U.S. Sprint Communications Co., the other major long-distance carrier in the national fiber-optic race, already has coast-to-coast T-1 lines in the ground and plans to make them operational by January 1987, according to company spokesman Michael Furphy. A 7,000-mile fiber-optic loop between U.S. Sprint switches in Chicago, Dallas, New York and Washington, D.C., already carries commercial traffic, he added.

Both of the above networks are segments of U.S. Sprint's planned 23,000-mile continental fiber-optic network, scheduled to become operational early in 1988. The company will own all 23,000 miles of cable.

"We did not lease to any significant degree because we want to own and control the network and avoid difficulties when we want to change or reconfigure lines," Furphy explained. "We would rather take the up-front costs and know what our product costs will be in the future." The network installation is currently on schedule, Furphy claimed.

Look before you link

From page 25

nondedicated server," Geier reports. "They said, 'We made an announcement last week — there is now a version of the 286 software that supports both expanded memory and a nondedicated file server.' "

The announcement was made the same week he received the software. "When I asked if I could exchange the Netware 86 package for the new release, they asked me if I had broken the seal on the package,'" he says.

"Because I had broken the seal on the instruction manual — not the floppy disks

— they refused to give us credit," Geier continues. "I would have to pay between \$500 and \$1,000 for an upgrade. This is insidious to me. How can I tell Review to give me another \$1,000 because Novell sold me the wrong product?"

Adding insult to injury, one of the people Geier spoke with at Novell handed him the following analogy: "If you as a consumer bought one color lipstick from Revlon, and the next day they released the color you really wanted, would you be entitled to credit for the up-grade?"

John Barracough, Novell's director of public relations, was apologetic when Computerworld apprised him of Geier's tribulations. "We feel sick about what

happened; there have been communications problems within Novell, not everyone in the chain knew about the update," he said. Novell plans to "make it up" to Geier with either some form of reimbursement or credit for the package he mistakenly bought.

Barracough added that in November Novell set up a Netware Services Division with toll free number "to handle just this sort of problem."

The division was not in operation when Geier's problem arose.

If there is a moral to this story beyond "Let the buyer beware," it should probably be, "Before you open a package, make sure it's the one you want — especially when it comes to LAN software."

SYSTEMS & PERIPHERALS


HARD TALK

Donna Raimondi

Eyeballing optical cards

Two announcements that recently came into Computerworld, both arriving on the same day, point to the emergence of optical memory card systems in the not-too-distant future.

Drexler Technology Corp., in Mountain View, Calif., and Toronto's Optical Recording Corp. both announced agreements with major providers of practical use for the infant technology.

Drexler signed a \$1 million deal with the \$1.2-billion British Telecommunications PLC, the major telecommunications network operating company in the UK. British Telecom plans to offer Drexler's Lasercard information systems in a number of markets, starting with a trial system in a large London maternity hospital. "It's possible to put photos of X-rays, sonograms and notes on the same card," a Drexler spokeswoman says. The Lasercard currently holds 2M bytes of data on an optical strip and can be either read-only or write-and-read.

The deal is one of 27 that Drexler has with companies throughout the world that are developing applications for the card.

Optical Recording Corp., a much smaller company with 24 research engineers, has signed a marketing pact with Blue Cross/Blue Shield subsidiary Lifecare International, Inc., in Towson, Md. The Optical Recording card is said to carry 50M to 200M bytes of information. Instead of using a strip, the entire credit-card-size surface can be covered

See EYEBALLING page 32

Raimondi is a Computerworld senior writer.

Watch production levels

Could be key to tracking IBM systems' depreciation

By James Connolly

LAS VEGAS — Recognizing when IBM factories reach full production levels for a mainframe is the key to knowing how long to depreciate and when to sell the previous generation of systems, according to one of the designers of the operating system for the IBM 360.

It is around those full production points, not announcement dates or first customer shipments, that IBM bases its product cycles, said Jack van Kinsbergen, senior vice-president of Books & Babbage, Inc. Van Kinsbergen addressed a group of capacity planners at CMG '86, Computer Management Group, Inc.'s International Conference on Management and Performance Evaluation of Computing Systems.

Van Kinsbergen, who worked on IBM's 360 development team during the 1960s, charted IBM CPU announcements, deliveries and production levels from the late 1960s up to the current generation of 3090 mainframes. He then used those charts to analyze residual values of the various sys-

tems. "IBM CPU schedules are driven by the need to maintain factory capacity," van Kinsbergen said. "If you can predict when IBM will reach full peak production of the next CPU, then you can predict when the current CPU's market value will slip below the 40% level."

He also observed that IBM reaches those peak production levels for system generations roughly every eight years, with two families of CPUs — such as the 3080 and 3090 mainframe families — covering those eight years. Using that formula, van Kinsbergen estimated that the 3090s being produced today will be worth 30% of their list price in 1991, when the next generation of machines, known as Summit, is reaching full production. He predicted that Summit will be announced in 1988 with initial shipments in 1989.

Van Kinsbergen also maintained that despite the computer industry's focus on personal computers and mid-range systems, mainframe technology is far from dead. "Mainframes are here to stay, regardless of what happens with PCs and IBM's 9370s. When all of those things are networked, demand for mainframes is going to go up," he predicted.

See KEEP page 32

INSIDE

Analyst claims heated mainframe competition means better price/performance from IBM/32

NEW THIS WEEK

■ EMC Corp. offers cache expansion for IBM 3880 storage control units

■ For more on this and other new products, see pp. 45-47.

INSTANT ANALYSIS

"The challenge of the 1980s can be summed up in one word: competitiveness."

— George Seitz, senior vice-president, IBM Corporate Business Units.

Alpha replaces multiuser line

By David Bright

SANTA ANA, Calif. — Hoping to increase its vertical market penetration, Alpha Microsystems, Inc. has replaced its most popular multiuser supermicrocomputer systems with a new line of low-end systems.

Both the new AM-1200 systems and the earlier AM-1000 models use the Motorola, Inc. MC68000 microprocessor to run Alpha Microsystem's proprietary AMOS.

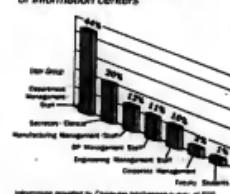
Beginning next month, the systems will be sold on a turnkey basis by value-added resellers, said Bud Collins, Alpha Microsystem's director of product marketing.

See ALPHA page 32

DATA VIEW

Center usage

Departmental staff makes most of information centers



Emulex announces switches, disk drives at DEXPO

DEC-compatible tools slated to ship in '87

By Donna Raimondi

NEW YORK — Emulex Corp. announced four products for the Digital Equipment Corp. marketplace at last week's Dexpo, DEC's third-party show.

The Net41 switching option for an Emulex CS41T1 DEC-compatible asynchronous multiplexer allows up to 143 terminals users to access any one of up to six DEC VAX host computers, Emulex said. No external switching hardware is required.

The Net41 provides a port on each of the VAXes, and the switching function is distributed among the host systems so that the failure of any one

system will not impact operation of the network. Terminals can be placed up to 5,000 feet apart using a single twisted-pair cable.

The CS41 with Net41 occupies a space one-half the size of a VME and features 50,000 character/sec. throughput. The CS41 with one 24-line distribution panel and switching firmware costs \$4,500. Adding the Net41, which will begin shipping in March, will cost \$1,000.

A removable Winchester disk subsystem, aimed at applications that require portable, modular data storage, is housed in a 19-in. rack-mounted chassis that also contains the power supply, drive status indicators and a disk controller that connects the subsystem to a Small Computer System Interface (SCSI) bus.

The subsystem consists of one or

two disk drives, each enclosed in a portable drive module. Either an Emulex UC04 Q-bus or UC11 Unibus host adapter, as appropriate, is required to connect the subsystem to DEC's Microvax I or II, PDP-11, MicroPDP-11, LSI-11 or VAX-11.

Storage capacity ranges from 170M bytes in a single portable drive module to 750M bytes in two modules.

Linking subsystems

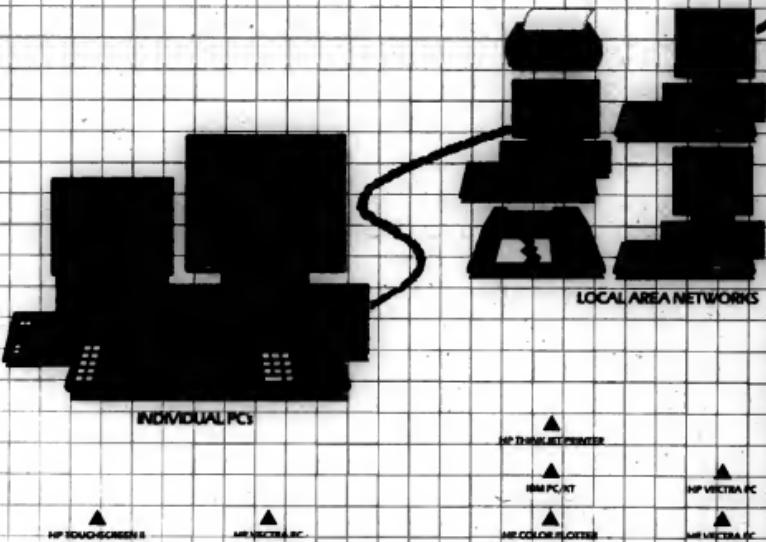
Users can obtain as much as 3G bytes of storage by linking four subsystems in a daisy-chain with the SCSI interface. The subsystem costs \$4,300, and the portable drive modules cost \$3,372 for 170M bytes and \$7,422 for 380M bytes. The subsystem is also expected to ship in March. The company also released the

QDS8 dual-wide DEC Q-bus-compatible Storage Module Drive/SMD-Enhanced disk controller, which emulates the DEC KDA50. It supports the Microvax, MicroPDP-11 and LSI-11 Q-bus based systems using a standard Mass Storage Control Protocol command set. The \$2,700 unit provides an interface from the host of QDS8 to SMD/E-compatible disk drives with data rates of up to 3M bytes/sec.

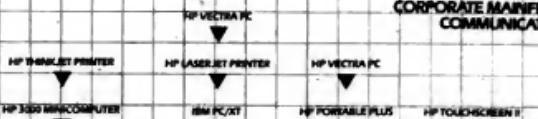
The CS08 nine-line Q-bus multiplexer with DEC DHV11 multiplexer emulation is said to connect as many as eight terminals to the Microvax II. It uses half the mounting space as the DHV11 for the same number of asynchronous lines, the company said. The CS08, which costs \$1,000, is a dual-wide board with RS-232 interface compatibility.

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DEPARTMENTAL SYSTEMS

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SYSTEMS & PERIPHERALS

Challengers spur IBM to up price/performance ratios

Mid-range systems, mainframes affected

Competition in a marketplace can be scary for buyers, who may be confused by vendor claims, and sellers, who do better. But competition also can be beneficial, and, according to one consultant, it's proving to be so in the mainframe world.

Bob Djurdjevic, president of the Phoenix-based Anaxex Research, Inc., computer research and consulting firm, tracked price/performance figures for IBM mainframes and intermediate systems such as the IBM 4381 from 1980 to 1986. One of his conclusions is that, as competition heats up, IBM finds ways to provide better price/performance ratios.

As evidence, Djurdjevic points to IBM's ability to ship a high volume of 3090s during the first three quarters of 1986 while its plug-compatible manufacturers (PCM) competition could ship only limited quantities of their own high-end systems. Note that price/performance in large systems grew at a compound annual rate of 26.5% from 1980 to 1986; however, in 1986, with the competition limited, the growth rate slowed to 3.7%.

Furthermore, Djurdjevic found that price/performance in the intermediate market grew by more than 15% per year from 1980 to 1985. In 1986, however, he sees the growth jumping to between 23% and 29%, based solely on list prices. The consultant notes that in 1985 there was little pressure on the 4381, which still seems to be carrying the load for the 4300 line.

Now the situation has changed, he notes. Djurdjevic asserts that compa-

nies such as Digital Equipment Corp. and NCR Corp. and PCMs such as Nandorf Computer Corp. and National Advanced Systems Corp. are challenging the 4380s, which resulted in the February mid-life kickers for the 4381 line.

In another price/performance analysis, International Technology Group (ITG) says the 50% price/performance gain of the recently announced IBM 9870 over the older IBM 4361 is the largest IBM hardware price/performance boost since the 4331 and 4341 were introduced in 1978.

The group says IBM is working hard to reduce costs and speed production in connection with the mid-range 9870. ITG reports that IBM hopes to produce 9870s in one-fifth the time it takes to make 4381s. The benefit for IBM might be a booming gross margin of 80% to 90% for the 9870 by early 1988, according to ITG.

Southwestern Bell Telephone Co. plans to use Tandem Computers, Inc. Nonstop EXT10 and Nonstop TXP systems to manage its Public On-Line Operations network. That network deals with revenue, marketing, installation and other management functions for Southwestern Bell's public pay-phone operations.

The TXP will be installed in the company's St. Louis headquarters for software development. The EXT10 will be installed in nine cities throughout the Southwest during 1987 and 1988. The network will tie into existing Southwestern Bell mainframes for sharing service order

and toll data.

Cipher Data Products, Inc. signed to supply IBM with the Cipher 1880

Microstreamer tape drive with the intelligent peripheral interface (IPI).

face (IPI). The IPI drives will be used with the 9870. A Cipher spokesman says IBM is the first major company to contract for the 16-in. reel-to-reel Microstreamer drive with the IPI.

Intel Scientific Computers, a division of Intel Corp., sold two Intel DPS concurrent computers — both 32-node, one vector and one expanded memory with LISP model — to the Air Force Institute of Technology (AFTT) in Dayton, Ohio, for use in computer science research related to the Strategic Defense Initiative (SDI). SDI is the national program related to defense against ballistic missiles.

"It is clear that massively parallel computing is the only means to parallelize the computing power needed for the SDI program," said Lt. Gen. James Abramson, director of the SDI organization. AFTT will use the

systems for study and analysis of distributed processing systems.

Scientific Computer Systems Corp. (SCS) received \$15 million in third-round funding, bringing its total equity financing to \$32.7 million. The company also announced shipment of its first microsupercomputer, the SCS-40, to the San Diego Supercomputer Center at the University of California. SCS will consolidate its Wilsonville, Ore., and San Diego operations, where three-quarters of its employees work.

An automated optical disk media manufacturing facility for IBM Corp. is near completion in Menomonee, Wis., a SCS spokeswoman said. The write-once disk manufacturing system will be built to SMI specifications by the West German firm Leybold-Heraeus, a manufacturer of thin-film production equipment and Techomix of Belgium, a robotics and materials handling specialist.

The factory will take over the work now being done at SCS' Milpitas, Calif., branch, leaving that facility to pilot optical disk specialized products, the company said.

HARDWARE NOTES

Eyeballing optical cards

From page 29

with information.

That is a theoretical possibility with the Drexler Lasercard too, the Drexler spokeswoman says, but the company's research indicates there is not a customer demand for it.

Optical Recording President John Adamson says he has high hopes for the optical card industry. The optical card most interesting feature seems to be in patient cards in hospitals or medical cards for insurance companies. But beyond that, Adamson says, the tiny piece of plastic — about the same size and flexibility as a usual credit card — may offer an alternative to optical disks in imaging systems and a replacement for magnetic tape in data storage applications.

Another possible use for the technology is as storage media of choice for aircraft, automobiles or other machines. A California company is already building a system that allows car drivers to access maps on a screen. While the company is designing the system with magnetic tapes, Adamson says, it is an application that would lend itself to the tiny optical cards.

A single optical card full of the optical cards, which Adamson says he believes he can have manufactured for about 25 cents each, could replace an optical jukebox for imaging storage. At 200M bytes apiece, 10 to 15 of the cards would replace each 12- or 14-in. optical disk, which cost about \$50 apiece.

At this point, such conjectures are pie-in-the-sky. Optical disk prices will come down, sophisticated read/write units need to be developed for the cards, and a market does not exist yet because the technology is not quite ready to take off. But there

are signs that point to a good-size marketplace.

Drexler already has 27 licensees working on drives and testing markets. It can manufacture about 25 million cards a year, and a spokeswoman says 1987 will be the year the cards get used. Five large Japanese companies that license from Drexler have developed prototype systems and are moving quickly to implement the technology.

Lifecard International President Jim Nakopulos is a distributor for both Drexler and Optical Recording products. The two vendors use very different technologies to achieve the same end, he says. The lasercard has not come to the point where it is useful, but that should end shortly. Systems components

The three components of a system are the read-write device, the card media and software. While software is "under control," the other pieces have yet to become widely available, Nakopulos says. When they are — probably sometime in 1987 — Lifecard's system will first be used to support membership cards for clients of a new Blue Cross/Blue Shield insurance program. The second application may be in-house records for a Blue Cross/Blue Shield health maintenance organization.

After that, Nakopulos sees the card replacing imaging systems, a project he is already at work on in a small way. Eventually, he says, a medical card that records a person's entire medical history will be possible.

The success of some of these projects is limited by factors other than technology. For example, hospitals and doctors will not all agree to be put on one medical card, and legal questions may have to be decided before it can be done.

But the laser card seems to have a bright future, and 1987 should see the first significant push toward its implementation.

Keep eye on IBM production levels

From page 29

In a related address at CMG '86, Jerry L. Rosenberg, a consultant with BGS Systems, Inc., warned that decisions about upgrading IBM 3080s or replacing them with 3090s must be based on discussions between the technical and business staffs at an organization. Rosenberg noted that even if an organization needs more power, an IBM 3084 may be a better acquisition than a 3090 because of its ability to handle various types of processing at a lower cost.

He said some configurations of 3080s provide the same performance as 3090s in certain applications and that considerations such as memory capacities and the number of channels can be as important as raw CPU power for many applications.

He concluded that the choice between a 3084 and a 3090 depends on the customer's needs but suggested taking into consideration the nature of the applications being run. He cited the case of a customer who wanted to expand his IBM TSO environment and could save \$750,000 during a three-year period with the 3084; another customer, running IBM CICS, found significantly better response times on the 3090 Model 200.

Alpha replaces multiuser line

From page 29

The firm's target markets include the dental, medical, legal and educational areas as well as municipal government.

System improvements include increased random-access memory (RAM), the addition of very large-scale integration for video cassette recorder (VCR) backup, the addition of a parallel port and extra serial ports and a change in the machines' mechanical design to allow for better service.

System prices start at \$8,300 for a five-user machine with the AMOS operating system, 1M byte of RAM, a 20M-byte hard disk drive, terminal, remote control port for VCR backup and parallel port, according to the vendor.

A 15-user system is priced at \$11,630 with a 35M-byte hard disk drive, or \$13,300 with a 70M-byte drive.

Memory in the systems can be expanded to 4M bytes.

Alpha Micro promotes its AMOS operating system as a low-overhead, high-performance alternative to Unix. More than 600 applications packages have been developed for the operating system.

In Depth

Jacks of all trades

Four veterans recall DP's salad days



Rex Farley



Ed Berger



Jack Feise



Ray Spurr

'When I was managing equipment, I knew everything that was going on in my shop. As the DP job has become more complex, one person can't keep up with it all.'

— Ray Spurr
Retired large-systems manager
U.S. Army

By MICHAEL SULLIVAN-TRAINOR

Information systems professionals seeking posts in today's highly competitive MIS environment might envy the ease with which Ed Berger became systems manager for Rayovac Corp. in Madison, Wisc., more than 40 years ago.

"I was working in the clock department, and my boss was the manager of punched cards and clocks. When he learned he was drafted, he turned to me and said, 'There's the punched card equipment, Ed. Go ahead and figure out how it works,'" Berger says.

Berger started at Rayovac in 1936 as a mail boy, and he had worked his way up through the accounting department when he was handed the data processing responsibility. The move paved the way for a 48-year career with the company.

"My dad said, 'Don't be a job-hopper,' and I took his advice to heart," he says.

Berger's unglamorous entrance into the computer field was not unlike that of many of his peers. For example, Ray Spurr and Jack Feise, each of whom had data processing careers spanning more than 30 years, were not prompted by a long-standing interest in computers. They both became involved in systems operation because they were in the military at a time when computer operators were needed.

Likewise, Rex Farley, who worked for state and county government data processing departments in Arizona from 1960 to 1984, decided to take an IBM course in computer operation because he was dissatisfied with his job as a supervisor at the Arizona unemployment office.

"The average man on the street didn't know there was such a profession. Most of the people back then got into it by accident," Spurr notes.

DP ruled the roost

Although they entered the field with little experience and often had to deal with inefficient computer equipment, these early data processing managers had one thing that most of their counterparts do not have today — absolute control.

Rather than having to deal with demanding corporate needs and savvy personal computer users, the old-timers worked within corporations where the rest of the company relied on their services but had little or no knowledge of how computers worked. These old-timers were allowed to build an independent domain where they

Sullivan-Trainor is a senior writer for Computerworld.

In Depth/DP Veterans

were the rulers.

"DP used to be the source. All documents were delivered there, and all output came from there. We spoke our own language, and we used to be able to talk to end users in this strange dialect and give them a snow job. They'd have to go along with it because they didn't know what we were talking about," Peise says.

With this power came the responsibility of maintaining the equipment. This was a challenge that was not always easy to overcome because of the lack of sophistication of the computer industry at the time.

Often the data processing manager was the only person in the organization who knew the ins and outs of a particular machine, so the DP manager had to double as a systems troubleshooter or repairman when problems arose.

"In the early days, you had more control of the equipment. You had to have the control because there was a lack of engineers. A lot of us had to be engineers ourselves, and we worked 'round the clock. We also hired girls from the farms because they knew how to use a pair of pliers fairly well. We were self-sufficient," Berger says.

With the punched card systems, aggression rather than skill was often required to keep the machines operating, according to Berger.

"Back in '40 when the printer went down, and I couldn't figure it out, I did call one of the servicemen. He told me to take a paddle and hit it. So I kicked the hell out of it, and whenever it was that had been stuck once loose, and it started working again."

Starting his career in 1950, 10 years later than Berger, Peise found that technicians were more available, but he still ended up making his own repairs.

"I would have the telephone in one hand and the screwdriver in the other," he says.

IBM or nothing

When Berger made equipment purchases in the 1940s, there really was not a lot of choice. During his tenure at Rayovac, he used mainly IBM punched card systems, including the 402, 403 and 405.

"We started with IBM and tried to get into some other equipment, but the city of Madison was pretty solid

IBM. If you went against IBM, it was like going against motherhood. I bought a Univac printer once, and I had everyone but T. J. Watson himself calling me," Berger says.

Peise also worked in IBM shops, first in the Navy in the early 1950s, then as a DP director at Washington State University and at the University of New Mexico.

He also worked for the Albuquerque Federal Savings and Loan, the state of New Mexico and the city of Albuquerque before he retired in 1982.

"All the organizations that I worked in in New Mexico in the process of coming from one piece of computing to another. My life was conversion, especially in the colleges and universities," he says.

During his career, Peise found himself in the middle of an ongoing controversy about centralizing or decentralizing computer systems. As he would be in the debate about departmental computing today, Peise was faced with an academic community that wanted its own dedicated computing equipment for number-crunching tasks and experimentation. But he also had to meet the needs of the school's business applications, such as payroll.

"The universities always needed two kinds of computers because there wasn't one designed to do both business and scientific applications. The professors and the business people could never agree on what they wanted to do. It was a continual power struggle," Peise says.

"The minicomputers they have today are fantastic. Now the scientists can be independent and still have the power of a big box," he adds.

Another contrast between present equipment and past is the processing speed. In Peise's day, it would take a full day to run a payroll for 500 people on equipment that required the input to be keypunched before it could be processed.

"You tried to do the payroll once or twice a month, because if you did it weekly, that would be all you could do. The full payroll would take days, perhaps even a week," he says.

The option to move from punched card machines to vacuum-tube computers, which gradually became

available, was not an attractive one because the early vacuum-tube machines were unreliable, according to Peise.

"There were tubes all over the place in those machines. The early computers were not that great, and the electromechanical machines were far easier to maintain," he says.

Berger also favored electromechanical equipment because of its maintainability.

"I would liken it to automobiles. I

that processed 50 or 60 cards per minute.

After a brief time in private industry, Spurr went back to the military in 1965, where he eventually joined the Automated Logistics Management Agency, the central programming development agency for the Army.

By the time he retired in 1977, Spurr had advanced to managing large-scale, high-speed, tape-driven IBM computers that operated with stored programs. These represented the state of the art at the time.

"When I was managing," says Spurr, "I learned everything that was going on in my shop. As the data processing job has become more complex, it's no longer possible for one person to keep up with it all," he says.

When Rex Farley began his data processing career in 1960, one of the first machines he worked on was an IBM 1440 computer, a new addition to Arizona State University's computer operations at the time.

A tape-driven computer, the 1440 operated using a six-bit code.

"Way back in the '60s, we were talking milliseconds. In those days we would put the computer to work on problems such as sorting 300,000 items for wage calculations."

"We had to sit there and go take a long, long lunch and come back and watch it finish the job. If you did something like that on today's computers and it took a half hour, that would be a long time," Farley remembers.

Farley left his post as the university's computer manager to serve two years in the state legislature.

But he was back in data processing after his term expired, with management positions in the Arizona Department of Education, a county computer department, the Trans American Bank in Phoenix and finally back to the state again in the Department of Administration.

During that time, he worked with a steadily evolving level of equipment and a continuously expanding management role.

"It used to be that the DP person was more of a working manager. Of course, he had been an equipment operator first, rather than a corporate manager," Farley says.

More of a corporate manager

"Originally, it was not as important a position. Now the DP manager is more of a corporate manager who works with things outside of the department with responsibility to other corporate people over him. I don't know if he's lost control as much as lost touch with the equipment," Farley says.

"Now if you tried to be a working manager, you would fall behind. Things are much more complex than they used to be, and you have to have someone else maintain the equipment while you deal with outside issues," he adds.

Despite the complexity, it is hard for some former managers to give up the world of conversions and upgrades in exchange for relaxation and retirement.

"Now Rayovac is doing well. I'm 69, and I told the company president that I'd almost like to apply for a job there again to work with the new technology," Berger says.

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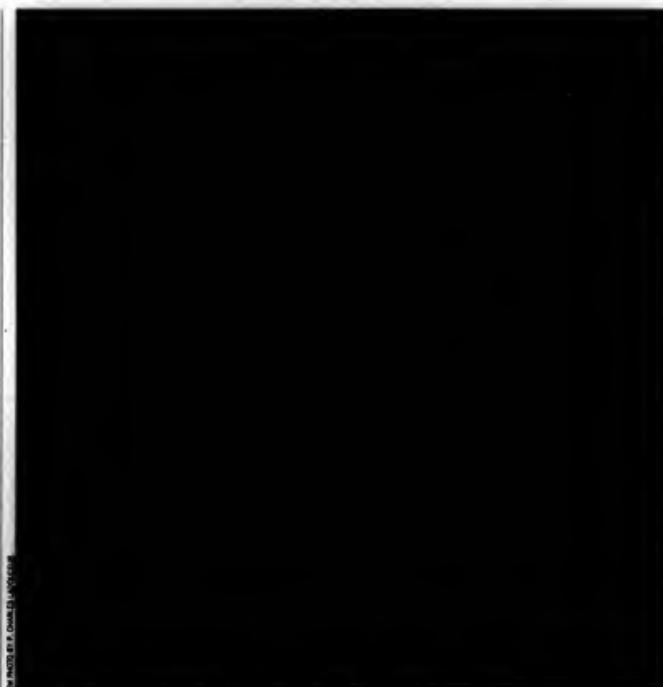
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Executive Report



Thinking Machines Corp.'s Connection Machine ushers in the age of parallel processing.

PHOTO BY P. CHARLES LAROCHE

The next generation is already under way

By GLENN RIFKIN

At the Thomas J. Watson Research Center in Yorktown Heights, N.Y., IBM researchers are at work on a machine that will calculate the mass of a proton. Such a calculation, which requires 3×10^{17} arithmetic operations, would take a supercomputer like the Cray 1 approximately 100 years to complete. IBM researchers decided the problem could be solved only by parallel processing, and they set out to build a machine to do it.

Once this computer, capable of running at 11 billion floating-point operations per second (GFLOPS), is completed within the next 12 months, the machine will spend approximately one year focusing on this problem of quantum chromodynamics theory — determining the trans-

sition probabilities of quarks and antiquarks within a proton, which in turn determines the mass of that proton.

Though this type of esoteric scientific research is a long stretch from IBM's typical applications in the MIS world, it does represent an opening of the door to the future. This IBM research computer, composed of 576 processors and called the GP11, is but one of many parallel processing projects under way in both corporate and university research labs. And it is parallel processing, a logical but dramatic step beyond traditional von Neumann serial processing, that promises to usher in a true scientific Renaissance and the renaissance of computing.

"It is our view that the right question is, 'What kind of parallel processing will we be doing in the future?' not whether we will be doing parallel processing or not," says Tilak Agerwala, director of symbolic and numeric processing at IBM's Watson Research facility.

"It's a revolution," adds Prof. Michael Dertouzos, director of MIT's Laboratory for Computer

Rifkin is a Computerworld senior editor.

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It is IBM's view that the right question is, 'What kind of parallel processing will we be doing in the future?' not whether it will be doing parallel processing or not.

Next generation of processing

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Science. "It's going to sweepingly change our field. The reason is simple. You are looking at a field that for 30 years has been using single processors, and now suddenly you open the gate and say, 'We don't have to work alone.' We are moving from an era where computers were like single craftsmen building houses in the basement to the mass factory era where you've got hundreds or thousands of computers working on one job."

The idea of running a program in parallel is simple to conceive but the actualization is not easily attained. Obvious benefits include these:

- Higher performance.
- Better price/performance ratio.
- Higher availability.
- Upward scalability.

Although debates rage as to the physical limits of single processor machines—the exact limit is the speed of light—everyone in the industry agrees that wall rooms out there, large and impenetrable. Using multiple processors is not an alternative; it is the only alternative,

especially if one hopes for breakthrough in AI applications.

"It is clear that the applications that we are dreaming of—speech, vision, more intelligent programs in general—cannot be achieved with single processors," Dertouzos says. "We're going to need multiple processors to have any hope of tackling these problems."

If parallel processing does in fact represent a revolution in the information age, then the chips and drums are already starting to play. Parallel processing computers are off the drawing boards and are being sold today, albeit by just a handful of makers to specialised audiences.

The early efforts, however, are impressive. In Cambridge, Mass., two companies with markedly different approaches are already selling and installing massively parallel computers. One, BBN Advanced Computers, Inc., a subsidiary of Bolt Beranek and Newman, Inc., has taken the pragmatic approach with its 256-processor Butterfly machine. Down

Continued on page 37

PARALLEL PROCESSOR START-UPS: A SAMPLING

Company	Processor	Primary Target Market	Mid-'85 Installed Base Estimate	Price Range (in thousands)
BBN Advanced Computers	Motorola 68010/20	Technical	70	440-375
Floating Point Systems, Inc.	Inmos Transputer	Technical	8	500+
Flexible Computer Corp.	32032/68020	Technical	12	100-1M
Intel Corp.	80286	Technical	45	250-850
EISA Co.	Proprietary E2L	Technical	81	400-3M
Alliant Computer Systems Corp.	Proprietary CMOS	Technical	32	270-675
Thinking Machines	Proprietary	Technical	6	1M-3M
Areté Systems Corp.	Motorola 68000	Commercial	1,100	50-700
Sequent Computer Systems, Inc.	32032	Commercial and technical	120	95-800
Pyramid Technology Corp.	Proprietary	Commercial and technical	250	260-500
Tandem Corp.	Intel 8086/80286	Commercial	28	160-8M

Information provided by International Data Corp.

Parallel symbolic computing extends AI opportunities

**By CAROL WIEZEMANN
AND SARAH HESSENBACH**

The link between parallel processing and artificial intelligence is not structurally inherent. But it is being forged anyway by those who believe there is tremendous power and opportunity in what is being called parallel symbolic computing.

The bottlenecks caused by the centralized controllers of sequential, or von Neumann, hardware architectures are as limiting to AI applications, which tend to be computationally intensive, as to numeric ones. But it is important to understand just how AI applications such as expert systems can and cannot benefit from parallel processing.

By applying parallel processing—or multiplying or partitioning processing—to solving problems with exponential complexity, which is typical of AI, it must be understood that parallel processing is useful in boosting computational efficiency but not in extending the solvable problem size. The key to extending AI problem size is the development of better models and more efficient heuristics, not parallel processing.

Within the bounds of that caveat, parallel processing holds as great a promise for the computational liberation of AI applications as for numeric ones. But the significant differences between numeric and AI applications mean that parallel symbolic computing will bear its own distinct characteristics and will require unique kinds of research.

The differences are worth noting: Numeric computation emphasizes the arithmetic; the primary function of numeric programs is to deliver numbers to an arithmetic

unit to calculate a result. Numerical programs usually have a comparatively data-independent flow of control with a relatively predictable control sequence.

In contrast, symbolic computation emphasizes the reusability of data; the principal function of a symbolic program is to reorganize a set of data so the relevant information in it is more useful and easier to extract. Thus, the sequence of operations in symbolic programs is often highly data dependent, and control sequences are far less predictable than in numeric computation.

So putting parallel processing to work on AI problems becomes in large measure a software issue. In general, there have emerged two approaches to programming parallel processors: "parallelizing" compilers and parallel programming languages. The former are attractive for their effort to "keep" conventional, sequential, parallelized programs from being corrupted by a compiler and run-time system, relieving the programmer of having to think about parallelism. On the other hand, parallel programming languages encourage programmers to develop whole new ways to solve present problems and offer the means to tackle new breeds of problems.

Hence, those researchers and commercial developers who are applying parallel processing to AI problems have begun generating parallel AI programming languages. Some of these have been independently developed; others are implemented with specific machines. While most of this activity is under way in research labs, the beginnings of commercial parallel symbolic computing are emerging.

From MIT has come MultiLISP—a version of the LISP-like language, Scheme, extended to allow the pre-

processor to specify concurrent execution.

Carnegie-Mellon University's Adlers is an environment explicitly designed to support multiple languages and highly parallel computations; it can be used for many applications, like knowledge-based systems for speech and vision understanding, and was initially used to build a prototype speech recognition system.

On the commercial side, Gold Hill Computers, Inc., in Cambridge, Mass., has released a concurrent version of its CommonLISP for Intel Corp.'s iPSC Hypercube family of multiprocessors.

Under the Defense Advanced Research Projects Agency sponsorship, Bolt, Beranek & Newman, Inc. is developing a parallel symbolic programming environment based on CommonLISP for its Butterfly parallel computer.

These efforts represent only the beginning of the synergy between AI and parallel computing. It is a synergy seen more recently in terms of parallel processing helping AI.

Besides doing AI better, parallel processing will help break new AI ground, because the power of parallel machines will allow the application of as yet untried AI algorithms. The resulting capabilities could include searching large unstructured data bases via whole-document comparison and image comparison hundred times faster than is now possible on conventional systems.

And as parallel AI programming languages are honed, they can be used to integrate the operations of diverse embedded AI applications.

Indeed, it is arguable that in the years to come, parallel AI programming languages will be as important as—and even more important than parallel computers, for two reasons:

a) AI applications will come to dominate the software scene on both the high and low ends. On the high end, AI applications will tackle problems previously beyond the reach of even the most powerful conventional computers. On the low end, AI applications will be the raison d'être for millions of the presently computer illiterate to be drawn into computing by new capabilities that gradually meet their needs with ease of use.

b) These AI applications will attract parallel architectures on both the high and low ends. On the high end, parallel machines will be used for AI applications too large to be handled by sequential systems, so parallel AI programming languages will be required for development of the applications themselves as well as system-level capabilities.

On the low end, parallel AI programming languages will be required to develop software to handle interaction between the distributed and embedded AI applications that will be proliferating in the next decade.

Thus, parallel processing will play a critical role in AI. But AI will also help parallel processing, which is a new hardware technology that will be in need of revolutionary thinking in software development and programmer education if it is to carve out a place for itself in the commercial computer industry and make a contribution to human productivity and achievement.

Wiezmann and Hessenheimer are principals in AIM Publications, Inc., a Nutick, Mass.-based market research firm specializing in artificial intelligence commercialization that publishes the monthly "AI Monitor" newsletter as well as a series of market research reports on AI.

Executive Report Parallel Processing

Continued from page 36
 the road. Thinking Machines Corp. is breaking new ground with its 65,000-processor Connection Machine. Although both were funded by Defense Advanced Research Projects Agency (DARPA) grants before going out on the commercial market, the similarity ends there.

BBN, according to its Vice-President of Research and Engineering Randy Rettberg, prides itself on following a simple guideline into parallelism: Can you tie together current single-user, mainstream computer technology to produce a faster, more cost-effective machine? That simple notion is what drove us," Rettberg says about BBN's 15-year foray into parallel processing. "There were other areas of parallelism, but I think it is really a pocketbook issue."

The Connection Machine, designed by MIT wunderkind Danny Hillis, takes a more esoteric approach using what is called data-level parallelism — a technique that focuses each of the system's 65,000 processors on a specific and unique data element — to create an architecture that looks at a particular problem as a whole rather than in incremental parts.

Beyond these two vendors lies a growing list of superminicomputer or minisupercomputer makers — such as Alliant Computer Systems Corp., Sequent Computer Systems, Inc., Flexible Computer Corp., Intel Corp., Floating Point Systems, Inc., and Perkin-Elmer Corp. — that also bill themselves as parallel processing manufacturers. Seeing to fill that unmet need of the supercomputing need just below the ETA Supercomputer Inc.'s and Cray Research Inc.'s of the world, these start-ups generally have machines with fewer than 10 processors and often find themselves in the center of a storm of debate as to whether their machines truly qualify as parallel processors.

At the supercomputer level, Cray is also committed to parallel processing for the future (see interview page 39), while the mainframe and mini manufacturers are all dipping their toes in the water to test the temperature. IBM already offers multiple processors on its high-end 3090 machines, and with a recent vector facility add-on to the 3090 Model 400, the company is approaching supercomputer status. Companies such as Digital Equipment Corp. are keenly aware of the potential that parallel processing affords, and research projects in its Palo Alto, Calif., labs are under way on machines that run in parallel.

And as usual, perhaps the most innovative and groundbreaking work is being done at universities, such as Carnegie-Mellon, Stanford, Illinois, Cornell, MIT and California Institute of Technology. With government funding, academic research is not only producing breakthrough prototypes but is spinning this research off into commercial ventures such as Thinking Machines, a company that emerged from MIT.

Thus, the scientific/engineering community is taking an active interest in parallel processing, seeking means to greater processing power. The commercial computing world, however, has yet to find a way to embrace this new phenomenon.

"The hype has arrived now," says Jeffry Canin, a supercomputer ana-

lyst for Hambrecht & Quist, Inc. in San Francisco. "But the significant penetration may not occur until the early 1990s."

Dertouzos, for example, believes that such industries as banking, airlines, insurance and other large organizations will benefit from parallel systems in the not too distant future.

While technologists agree that parallelism represents the future, a surprising wave of confusion and conflict is emerging about this area of technology. There are, for example, many different definitions of parallel processing, and each is neatly shaped to fit the architecture of a particular designer. "That is the single biggest problem facing parallel processing," Canin admits. "No one has come up with a clean definition. It is an oft missappropriated word."

There are those, for example, who believe that multiprocessing and parallel processing are one and the same, whereas others assert there is a major difference between the two designations. And further, once one gets a general agreement on the blanket term "parallel processing," arguments rage about every parameter within the technology, from shared memory to granularity, from scalability to automatic programming.

What becomes clear quickly is that each proponent can produce persuasive arguments to defend his own approach. "At this point, there are obviously a lot of different approaches to the problem, and none of them has gained an upper hand," says Rich Mikita, a consultant for International Data Corp. (IDC) in Framingham, Mass.

A broad definition, generally accepted as an umbrella view of parallel processing, is that the term refers to the spreading of instructions from a single job stream across multiple processors. Ideally, this processing is done automatically by the compiler or the operating system so that programmers do not explicitly have to direct the tasks to individual processors. Multiprocessing, an achievement of such machines as ones from Alliant, Sequent, Encore Computer Corp. and Flexible Computer Corp., is the use of multiple processors to handle numerous job streams simultaneously.

Another accepted differentiation in parallelism is granularity. Granularity is what determines the range of applications that can be addressed

Continued on page 39

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 by a specific parallel processor architecture. Typically, fine-grained machines — such as Thinking Machine's Connection Machine — have thousands of relatively weak processors. Medium-grained machines — such as BBN's Butterfly — have several hundred strong processors, and coarse-grained machines — such as the Cray 2 — have a few very strong processors.

Those working at the leading edge of parallel processing, generally the academic researchers, put perhaps the most stringent standards on the label. At the Center for Supercomputing Research and Development at the University of Illinois, David Kuck has spent the past 20 years working on issues and answers to the field. He says he believes that "you don't want to get into parallelism unless you have to."

Kuck, who heads up the center's Cedar Project, a parallel supercomputer currently employing eight processors, insists that there are parameters that must be adhered to in order to produce a useful parallel computer. Shared memory, he says, is a given. Without that, major software problems develop immediately. Others take exception to Kuck's stipulation on shared memory, believing that shared memory machines are only the interim step between today's computers and future massive parallel machines.

Kuck says he also feels strongly that for the parallel route to be worthwhile, the individual processors must be extremely fast. The Cedar project, for example, is using processors with power ranging from 10 million to 20 million floating-point operations per second (MFLOPS). The Connection Machine, he points out, uses slow processors that individually do not come close to 1 MFLOP.

"Some people see cheap processors and say, 'Boy, let's use as many of these things as we can.' They are making a big mistake in terms of the difficulties in interconnecting them and having them share memory," Kuck says. Ultimately, the issue comes down to price/performance, he says.

Although he strenuously defends his own philosophy on parallelism, Kuck says he believes that the vast and varied number of programs in the U.S. will enhance rather than detract from this country's ultimate success in parallel processing.

"The approach of everybody going in the same direction is not the American way. You couldn't possibly force people to do that," he states. "As Chairman Mao said, 'Let a hundred flowers bloom.'"

For any flowers of parallelism to bloom, though, problems of the lack of software must be surmounted. Creating operating systems, compilers and programs in parallel is not easy and often blocks success. "You will find that a lot of people will tackle the hardware first and then go look for somebody to write the compiler. That's a big and difficult business," MIT's Dertouzos declares.

Hambrecht & Quist's Canin is adamant that parallel processing is not an issue of hardware. "It's substantially easier to link together the hardware, relative to the major breakthroughs in software that are required," he says. "It's an issue of

Continued on page 40

Cray strategy brings power to the problem

Since the Cray-1 was unveiled in 1976 as the world's fastest computer, Cray Research, Inc. has been a leader in the design of general-purpose scientific supercomputers. Cray Chairman and Chief Executive Officer John Salvenger talked with Computerworld senior writer Michael Stalinski-Traister about Cray's plans to incorporate parallel processing in future supercomputers.

What is your definition of parallel processing?

It usually means more than one complete central processor in the system operating on the same problem at the same time. Now, multiple processors can mean a lot of different things. It can also mean the ability to process more than one functional unit at the same time, such as being able to do a multiplication at the same time as you're doing an addition and a store.

What is Cray's plan for incorporating parallel processing in its future supercomputers?

We have it in there now. More than half the systems we install have more than one processor in the box. We see that continuing in the future and expanding. In other words, the first parallel processor or multi-processor that we sold had two processors.

Commonly now they have four, and our next version that we'll be introducing next year has eight. System 3 is working on the Cray-3, which has 16. [Cray Senior Vice President] Bruce Chen is working on a new design that won't be out for several years but probably will have 64.

Do you draw a distinction between multiprocessors and parallel processors?

I think the real power of multiprocessor architecture is in being able to operate on the same problem with multiple processors at the same time. That's not easy to do. And there are great price/performance payoffs the other way — running multiple job streams on multiple processors — and people have been doing that for a long, long time.

But the more interesting challenge is to use more than one processor on a single job. That is what we're doing. That is what we're aiming at.

I must say that many of our users, probably most of our users, still use the multistream approach. But we have a number of users who are very effectively partitioning their problems across more than one processor and getting very good performance.

Have Cray users been asking for parallel processing capability?

No. What Cray users would prefer is a machine that is 100 to 1,000 times faster than the machine we have now but looks exactly the same so that they wouldn't have to change the code.

Nobody has come to us and said



Cray's CEO John Salvenger

fact, probably not even a majority of the time.

Another fundamental difference is that most of those projects are hovering in the cost range of middle six figures or maybe up to a million dollars. We make machines that are \$10 million and up. Obviously, our machine has to be 10 times better than a million dollar machine; otherwise, nobody would buy it.

I would argue that therefore there are different price points, different performance points, and overall these projects are in different markets. However, if somebody figures out how to make a million dollar massively parallel processor really good, well that's fine, because then we'll make the \$10 million version of that.

What would the implications be if you could build that \$10 million machine with 1,000 processors, all operating in parallel?

It's a little bit like the difference between the left brain and the right brain. What we make are left brains. They're very fast, rational, deterministic kinds of machines. I think to use a massively parallel machine effectively, it's got to work more like our minds do.

Where we have a lot of processors in there, they're all slow, but they have a way of working together that's not deterministic. It's where one can easily come from and one instruction. If you get a machine working with 1,000 processors simultaneously, it's going to be thinking a whole different way from the way our machines think.

Why are you taking the evolution approach?

No one has demonstrated the other one yet. As a practical matter, that's what we can sell today.

How will problems with software development be solved to take advantage of the increased power of parallel supercomputers?

There are some very interesting but very fundamental things that need to be done to partition a problem across 1,000 or 10,000 or 65,000 processors. In my mind it's not a trivial thing. I don't know how that's going to be done.

Our approach is different. Our first approach is to split up a very large problem at splitting up the problem. Let's see if we can split it in two pieces. Okay, we've done that; now let's see if we can split it in four pieces. We've done that. Now let's see if we can do 16.

Are current languages, such as Fortran and Cobol, adequate for this new generation of machines?

We're struggling with that now at the four- and eight- and 16-processor level, trying to take Fortran code and run it across a set of processors. We're having some success, but it's not easy.

It seems to me if you're going to program 65,000 processors to do something, it's only logical that some kind of new language will be required.

Continued from page 20
 programming, and further, one has to make a decision of how much of that programming ought to be left to the computer itself and how much to the programmer."

According to Canin, that debate rages on among academics as well as among vendors. Some researchers, he says, would insist that for any breakthrough in performance, one is going to have to reprogram from scratch using parallel languages. Others, such as Koen, believe parallel languages such as Fortran and C can be incorporated in parallel and should be incorporated in a parallel system.

Alliant, for example, relying on theoretical work by Kuck, unveiled its FX/1 and FX/8 minisupercomputers last year to a highly positive response. The Littleton, Mass.-based company developed an automatic compiler that translates Fortran and allows that code to run on its eight processors. Using that technique, Alliant claims it can run programs designed for the DEC VAX at twice the speed for half the cost.

BBN Advanced Computers' Rettberg takes exception to the idea that automatic compilers are the answer. The Butterfly requires the programmer to parallelize the software, but BBN provides what it calls the Uniform System, a programming tool that automatically allocates parts of the work to each processor.

Rettberg is skeptical of compilers claiming automation of that function. "You have to look at the details of what Alliant is doing," he says. "It's

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'The revolutionary effect is not something I would look for in the MIS world anytime soon.'

— Rich Atman
International Data Corp.

simple to say that it is an automatic compiler; you just dump in your old Fortran code, and poof — it's all perfect. But I wonder about that. Because if in fact programming in parallel is hard to do, I wonder about our ability to automate that kind of thing. It's hard enough to automate things people know how to do."

Rettberg says that the software issues surrounding parallelism will disappear as more parallel machines get into the hands of more talented people. Despite Rettberg's optimism, the software issue takes on even more critical proportions when drawn against the commercial background. Canin says he feels that researchers in academia and in DARPA may in fact be looking at the most difficult experimental architectures, ones with little commercial appeal.

For data processing to embrace parallel processing, there must be a clear understanding of what is required of the user, according to IDC's Mikita. IBM dominates that market, and its competitors all offer similar

conventional architectures. This presents a formidable obstacle to new vendors and novel approaches. The vast investment in current technology, software and training users also presents barriers to change.

"The absence of much existing software as well as the introductory level of existing tools for application development is tough enough, but added to that is the difficulty in making the shift to thinking about DP problems with parallel processes," Mikita says. "To get the most effective use of the machine, you have to approach the problem in a different way, and that's something many people have not yet had a chance to do. The revolutionary effect is not something I would look for in the MIS world anytime soon."

Gordon Bell, director of the National Science Foundation's supercomputer project, takes it a step farther. He says he believes that the Information Age would readily embrace parallel machines, offering a cheaper, cost-effective alternative to today's supercomputers; in fact, it is so difficult to get time on today's supercomputers that an alternative is a must.

But there is a fatal flaw: misbalance. According to Bell, researchers tackle the main hardware questions in parallel, but such issues as software and peripherals — the balancing elements — are generally ignored. "You could run payroll like gangbusters on the Connection Machine, and those folks are working to build a disk system that will really

exploit the machine. But we have no parallelism in the disk area yet; that's called balance, and that's the stuff that never gets talked about," Bell declares.

Current developments in parallel processing

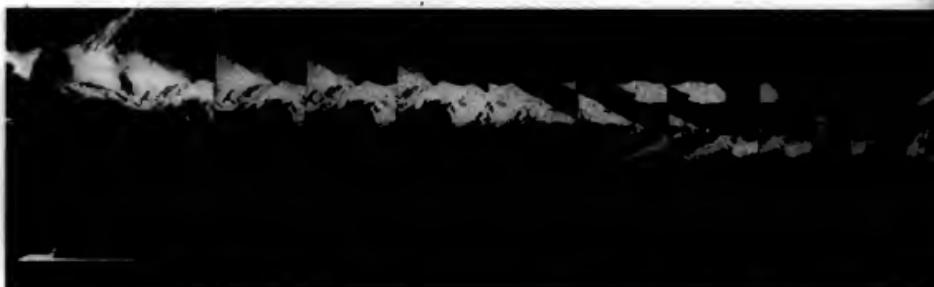
The scope of parallel processing computer development is vast and varied. The following is a sampling of what is being done in both the commercial and research worlds.

IBM. Among IBM's research projects are two massively parallel computer prototypes, one a highly specialised machine as described earlier and the other more general purpose.

Agerwala points out that IBM has already created highly parallel processors aimed at specialized, computationally intensive applications. "In these cases, the architecture, design and programming are very fine tuned so that you can get extremely high performance on a given well-defined application," Agerwala says. "There's no reason why you can't have highly parallel processors in the hundreds of GFLOPS or even a teraflop [trillion] range in use by the end of this decade."

IBM has, in fact, built two parallel processing machines already — the 256-processor Yorktown Simulation Engine for high-speed digital logic simulation; and a wire-routing machine used for routing the interconnection of wires on chips. The

Continued on page 42



PC TELECOMMUNICATIONS FROM A COMP

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The AT&T Model 4112 does everything the 4000 does.



The AT&T Model 4000



The AT&T Model 4112

Super power: Never enough

By KARL REED

The computing community's thirst for CPU power is insatiable. Modern commercial systems can supply between 50 and 100 million instructions per second, more than twice as many as a decade ago; power than the five supercomputers, the Control Data Corp., CDC 6600, delivered only 20 years ago.

Supercomputer vendors now talk in terms of millions of floating point operations per second or even billions of floating point instructions per second (MFLOPS), and still there is no limit in sight for the amount of power that can be delivered.

Increases in computer power come from two main sources: parallelism and increases in circuit speed. At very low levels, it can be cheaper to provide more parallelism than it is to attempt to increase the speed of a single CPU by using faster logic. Many of today's higher performance commercial machines contain two or more CPUs, and most supercomputers have multiple arithmetic units capable of applying a single instruction stream to multiple data streams.

There are basically three mechanisms by which conventional machines can be coupled:

- Coherency coupled. Both machine has access to the same or some shared memory at the internal bus level and may share a common pool of peripherals.

- Locality coupled. Machines may be connected to an I/O channel or some other high-speed channel. However, they cannot have direct or equal access to central memory.

- Networked. Machines communicate via a network, operating independently and communicating at relatively low speed.

Most supercomputers and most modern high-speed commercial machines are tightly coupled. The limits of locality coupled or more little architectures seem to be currently around 2 to 10 GFLOPS, a figure that does not even vaguely satisfy those applications that are black holes for computer resources.

Currently, the massively parallel machines are not in the category of solutions in search of problems, say major scientific supercomputer users, despite the apparent difficulty of conserving existing codes.

This conservation problem is quite severe, since the internal architecture of each machine is such that the best performance can be obtained only by coding the programs to match the architecture. Most performance improvements result from

the application of some new concept of the machine's architecture, invalidating programs written for other machines.

Nobel laureate, Kenneth Wilson, director of the Cornell University Supercomputer Laboratory, says that the commercial future of the parallel processor companies should be secure with sales to scientific users alone. He argues that it is easy to convert applications that may be only 1,000 lines of code.

"Of course, 100,000 lines of code is a different matter and will be difficult to convert to any new architecture, even a new vector machine," Wilson continues. His two points from his lecture that reflect the nature of the problem are the need to keep the architecture simple and the need to reuse the existing code.

The situation is vastly different in the commercial DP area. There have been few studies of the impact of vectorization on commercial data processing, even though Ken Iverson invented APL in 1961 and even though relational data bases are becoming more popular.

There are great incentives for finding a means of allowing commercial problems to be transferred to these multiple systems, mostly in terms of price/performance.

The fundamental problem, however, is that we currently describe our commercial problems in languages such as Cobol and PL/I,

which have a property I call "linearly elaborative." They describe a computational process that is a series of instructions executed in a totally predictable manner, one after the other. Also they require that the program, or the problem description, be written down one statement at a time, that is, linearly.

Further, the combination of the design methodologies used to write the programs and the compilers that translate them produces executable versions of our problems requiring a large contiguous address space.

As mentioned, the massively parallel machines will work well for problems with small data volume and are highly parallel relative to the strength of the computation. Any design methodology that recognises this fact and allows a commercial system to be designed as a collection of tasks that are largely independent but that communicate occasionally would produce solutions that may run satisfactorily on a massively parallel machine.

Ron L. Rivest is visiting faculty research associate in the department of computer science at the University of Maryland. He is now on loan from the department of computing at the Royal Melbourne Institute of Technology in Australia and is a consulting editor to Australian Computerworld.



ANY THAT NEEDS NO INTRODUCTION.

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AT&T
The right choice.

Continued from page 40
 current projects, the GF11 and RPS, are two different approaches to the parallel problem.

The GF11 is a single-instruction, multiple data stream machine with 576 proprietary processors, each capable of delivering 20 MFLOPS of power. Because the machine is so carefully matched to the problem it is intended to solve, Agerwala anticipates it will run at 90% utilization and be able to sustain 10 GFLOPS on the competing problem.

The computer, loosely targeted for completion in 12 months, is equipped with a powerful proprietary switch, a component that may be as important as the processors themselves, according to Agerwala. The RPS, he points out, is a more general-purpose machine using shared memory and a very high-speed network to achieve parallelism. It reportedly will include 512 processors that will run at 800 MFLOPS and is due to be finished in 1987.

In pursuing the RPS architecture, IBM sought to answer a list of questions about parallelism:

- What is the extent and granularity of the parallelism in applications?

- Should the parallelism be certified by the user or detected by the compiler?

- What is the impact of communications and bandwidth on stated performance?

- How do you write operating systems for these machines?

Agerwala concedes that neither machine will bring IBM into the commercial side of parallel processing, but insists that the company recognizes its importance for the future. "The field is very much in its infancy, and there is a huge amount of potential. We just haven't had much experience with machines like this," he declares.

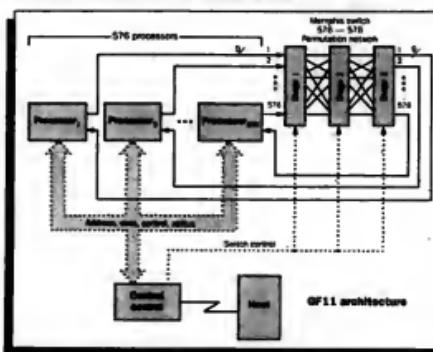
Despite his enthusiasm, Agerwala is not ready to discard traditional computing methods. "There will always be a place for very high-speed conventional von Neumann machines," he states. "We understand a huge amount about them; machines, having worked on them for the last 35 years, so we aren't going to let all that go down the drain."

MIT, Not surprisingly, MIT stands at the forefront of parallel processing research in the U.S. Activity in this area spans more than 15 years, and, according to Dertouzos, who heads MIT's Laboratory for Computer Science, more than half the lab's 360 researchers are working on multiprocessor-related projects.

Dertouzos recalls that thinking on parallelism began even earlier than 15 years ago, but it was not until the advent of the very large-scale integration technology that any serious work began. MIT's first major project, and still its most important in parallel computing, Prof. Jack Dennis's Dataflow computer.

Dennis, according to Dertouzos, conceived that computation could be done more quickly and efficiently than the sequential von Neumann method if computations could be performed in parallel — handing whichever computation was ready as it came up rather than waiting for each instruction to be processed sequentially. "As structures become more and more complicated, you still adhere to the basic rule, compute when ready," Dertouzos says. Using

IBM'S GF11 PARALLEL PROCESSING PROJECT: A LOOK AT THE ARCHITECTURE



the Dataflow concept, the MIT lab is building its Tagged Token Dataflow Machine, a 50- to 100-processor computer that will incorporate the dataflow concept of parallelism.

Prior to embarking on the actual building of the Tagged Token machine, the MIT lab built an emulation model of the unit to simulate what could be the expected result of the actual computer. This Multiprocessor Emulation Facility (MEF) combines 40 LISP machines from Texas Instruments, Inc., which are tightly interconnected with a high-bandwidth network. The MEF was used to simulate the dataflow machine before building began.

In a third major project, the MIT lab is parallelizing the LISP language into something called Multilisp. To do this, a computer called Concert was built consisting of 32 Motorola, Inc. 68000 processors. The project is being conducted in conjunction with Harris Corp., which is developing a commercial machine to run Multilisp.

BBN Advanced Computer BBN Advanced Computers is mandated to make a commercial success out of Bolt, Beranek and Newman's long involvement with parallel processing. In 1978, with funding from DARPA, BBN began work on its Butterfly parallel processing computer. The 256-processor Butterfly depends on a powerful proprietary switching network that not only allows for shared memory but provides for flexible upward scalability. BBN is "treating" using that upward scalability — and another DARPA grant — to develop the Monarch, an 8,000-processor computer that is not scheduled for completion for three years.

Meanwhile, the Butterfly has been a major success story for BBN. Already, BBN has installed 70 computers and, at this time, calls "the early adopter" market — scientific research labs doing simulation and signal processing applications. BBN believes that it has the early jump in what may prove to be a \$5 billion market, growing 25% to 30% annually, according to a study by Hambrecht & Quist.

The Butterfly is also at work in DARPA's ambitious Strategic Com-

puter, the Connection Machine is either the breakthrough computer to the next generation of computing or a rehash of a failed model created years ago. The \$3 million machine is designed for programs with a heavy concentration of data elements; the optimum is more than 10,000. Funded with DARPA money, the Connection Machine is at work both militarily in classified and in commercial research settings.

At the heart of the Connection Machine is its innovative data-level parallelism, a new technology created to get the optimum use of the 65,536 processors and 82M bytes of memory. The computer will execute one billion instructions per second.

As explained by Thinking Machines, data-level parallelism gains efficiency by doing many things at once. With two major sections to any computer application, the control section and the data section, large applications have tens of thousands of data elements. Many of the instructions in the control sequence are independent and may be executed in parallel by multiple processors. This control-level parallelism is the technique used by multiprocessor vendors. For the Connection Machine, this control sequence resides on a front-end DEC VAX or a Symmetric Inst 3000.

Data elements are also independent and may be carried out by multiple processors. This data-level parallelism is provided directly on the Connection Machine by assigning individual processors to individual elements of data. The system looks literally at the whole problem at once.

"We would all build the same machine if we could," Rettingberg says. "It would have a very large number of processors, all tightly interconnected, and they would all share memory and execute their own instructions. Because if you do that, you could use a subset of that to build any of the other machines that are out there today. The problem is that nobody knows how to build that machine in practice, and it would be wildly expensive. So you make compromises, and they may not be appropriate to the particular problems you are trying to solve."

According to Deborah Fanton, BBN's marketing communications manager, the search is on for software systems integrators and third-party developers interested in porting to a parallel system. "We're taking a lot of different approaches to prepare ourselves for two years down the line when this will be a very commercially acceptable technology," Fanton claims.

Thinking Machines In a darkened corner of the MIT Media Lab sits one of the first installed Connection Machines. Its 66,000 shining red diodes offer this message: "I blink, therefore I am." The message, though a clever effort of student programmers, may beiseat what this computer portends. From its conception in MIT's Artificial Intelligence Lab in 1983 until its commercial release earlier this year, the Connection Machine from Thinking Machines has had the parallel processor community abuzz. The work of W. Daniel Hillis, a 30-year-old former MIT graduate student, this futuristic 66,000-processor (each with its own small memory) computer has raised plenty of controversy in its first year on the market.

Depending on whom one speaks

to, the Connection Machine is either the breakthrough computer to the next generation of computing or a rehash of a failed model created years ago. The \$3 million machine is designed for programs with a heavy concentration of data elements; the optimum is more than 10,000. Funded with DARPA money, the Connection Machine is at work both militarily in classified and in commercial research settings.

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The interconnection of the processors is done through the software and can be changed between programs or during the course of a single program. The company claims that programming in data-level parallelism is also simpler than in control-level parallelism. There is no need, Thinking Machines says, to break up a program and assign sections of it to processors in order to get the benefits of parallelism. The processors are not assigned to the instruction sequence; they are assigned to the data. Moreover, a single copy of the instruction sequence is used by all the processors.

While the Connection Machine reaped great publicity when it was announced, not everyone is convinced of its innovation. Illinois' Kuck is skeptical. "There's very little there that was not thought of and in fact implemented 10 years ago at Goodyear Aerospace Corp. on the Staran machine and the Massively Parallel Processor," Kuck states. "They built a machine very similar to the Connection Machine. They didn't do it with DARPA money; they did it in the public domain, and they tried to put applications on it and to sell it. In fact they did sell a few, but it's a tough way to go."

Despite this, others, such as the National Science Foundation's Bell, view the Connection Machine as the only revolutionary step in parallel processing. Hambrecht & Quist's Clegg takes a more moderate view. "It's intriguing. I look at it as an experimental architecture," he says. "It's an impressive product to see, and it will probably be suitable for a much narrower range of specialized applications. For the near term, though, I believe it will be restricted to research applications."

MANAGEMENT



Janet Fidone

Avoiding the burnout blues

With year-end project deadlines that strikes fear into a manager's heart. It can significantly lower trained employees' energy and lesson their ability to perform effectively. And all too often, managers have lost valuable staff members to its demoralizing effects.

There are several precautions you can take as a manager to prevent losing employees to burnout, but first you must be able to recognize its characteristics.

A worker with burnout can experience the following common symptoms: negative self-image, antagonistic attitude, withdrawal and alienation.

But you can take steps to help a staff member suffering from burnout. According to DeAnne Rosenberg, president of DeAnne Rosenberg, Inc., Lexington, Mass.-based training and management consulting firm, the following actions have often proved to be effective:

- Detoxify the situation. Sit down and talk it out with the employee. Loosen the tension by communicating and bringing the problem out into the open. Let the employee know you are trying to help.

See **AVOIDING** page 44

Fidone is a Computerworld Senior Editor.

DP team seeks partners

TWA, Northwest target Sabre in reservation wars

By David A. Laddum

A data processing partnership being formed by Trans World Airlines and Northwest Airlines is looking for five additional carriers to join it as partners, according to a spokesman for the organization.

The additional players would give the partnership, PARS Marketing, much more capital and marketing clout, according to Jerry Hagerty, its manager of marketing communications.

PARS Marketing seeks major domestic and European airlines as partners. Hagerty says, "We're going after big ones," he notes. With the addition of Northwest, the PARS organization may want to expand in Asia, Hagerty adds.

The organization is one of two being formed with the purchase of one half of TWA's PARS reservation system by North-

west. The other concern formed by that purchase, PARS Services, provides reservation services for the airlines.

Approved by DOT

PARS Marketing sells reservation and off-line automation services to travel agents and others. The partnerships were recently approved by the U.S. Department of Transportation; their formations were expected to be finalized last week, according to Hagerty.

PARS officials report that they hope the new partners will help them close in on the leading airline reservation systems, American Airlines' Sabre and United Airlines' Apollo.

"Our five-year goal is to become the No. 1 reservation system in the country. Right now we're No. 3. We've got our work cut out for us," Hagerty says.

Following Sabre and Apollo, PARS Marketing plans to offer systems using personal computers — rather than using dumb terminals — sometime in 1987, according to Hagerty.

Firm analyzes employee benefits

By Alan Alper

NEW HAVEN, Conn. — In 1982, Rob Chernow figured that unless someone found a solution to the escalating costs of corporate health care benefits, many companies could be forced to cut the benefits or even go out of business.

Se Chernow, along with some colleagues from Yale University, founded Corporate Health Strategies, Inc. (CHS) to provide computer and consulting services to companies seeking to hold the line on health care benefit costs.

CHS's system analyzes claims data provided on tape by a client's insurance carrier. After reformatting and analyzing the

data, the firm recommends ways in which health care costs can be lowered.

This is a service that many MIS departments would like to perform internally but cannot. The departments are already overburdened with a multitude of other jobs such as payroll, and they lack the time to take on many new assignments.

"Companies which are not doing anything to manage their costs are facing inflationary increases in medical care and insurance of between 10% to 20% a year over the next five years," says Ron Goetz, CHS's director of marketing.

CHS provides two types of services: Cli-

See **FBM** page 44

Managers' bonuses a mixed bag

Slow economy stifles year-end spirit of giving

By David A. Laddum

Year-end bonuses in information systems departments may be down somewhat from last year, although managers' bonuses can vary considerably with industry performance, according to consultants and placement executives.

Executives' bonuses can also vary greatly due to differing industry practices and information philosophies, the analysts say.

Edward A. Fertig Associates, Inc. in New York stands by a recent forecast that on average, MIS bonuses will dip this year to about 10% of salaries from about 15% last year, due chiefly to the slow

economy, says Fertig consultant Peter Tamblyn.

MIS managers typically get bonuses of 8% to 12% of base salary, according to Joan Bernstein Gable, manager of the data processing placement division of Robert Half International, Inc. in Jericho, N.Y.

The bonuses could be based on the amount of money a top MIS executive saves or the amount he bills to users, reflecting divergent philosophies, Gable says.

MIS executives with six-figure salaries often get bonuses tied to company performance rather than to departmental results, says Michael Janulis, a senior executive at Positive Support, Inc. in Los Angeles. "They are typically officers with real management responsibility," she notes.

Janulis describes how company performance is affecting bonuses of three top

executives, each paid \$125,000 or more and managing data processing budgets of at least \$10 million. One, with a successful restaurant firm, is getting 18% of base pay. Another, in financial services, is getting a similar percentage. The third, with a manufacturer that has not done well, is getting no bonus.

In general, bonuses are lower in the nation's troubled Midwest industrial belt than on both coasts, Janulis says.

MIS executives at securities brokerages are more likely than those at other companies to get big bonuses tied to company performance, Gable says. The bonuses tend to be larger than MIS departmental run as profit-and-loss centers, she notes.

Even at the top, Wall Street MIS executives do not

See **MIS** page 44

DATA VIEW

MITCHELL J. HAYES

Motivating data processing professionals

Reverts and Associates of Atlanta surveyed 100 information systems professionals in the last year on motivators and demotivators in the workplace. The top five responses are shown below.



- What are two or three things that your managers do that motivate you or enhance your performance?
- Provide recognition, feedback and constructive crit. 62%
- Give me independence and give me the power to make decisions 46%
- Give me interesting, challenging work 38%
- Encourage my career development and growth 25%
- Communicate with me in a timely manner 21%
- Treat me as a part of a team 21%



- What are two or three things that your managers do that have a negative impact on your motivation or reduce your productivity?
- Inadequate (or no) feedback and recognition 38%
- Poor treatment and discrimination 26%
- Overemphasis on rules and demands for perfection 25%
- Overmanagement; make me feel like I'm a good robot 22%
- Lack of feedback and recognition 21%
- Evaluate my performance unfairly 21%

MANAGEMENT

Firm analyzes worker benefits

From page 43

ents can either receive a written analysis detailing how they use their benefits and where costs savings can be made or they can access their benefit care benefits costs themselves.

For the latter, software an IBM Personal Computer AT-class computer is installed at the client site. A package called Corporate Health Analysis Package (CHAP) enables users to dial up an IBM 3085 mainframe that CHS uses on a time-sharing basis to access and analyze its health benefit and insurance data.

Using CHAP, a client can examine minute characteristics of its health

care benefits. It can analyze plant sites, job categories and age groups or specific doctors and hospitals that treated employees and can analyze their charges, Goetzl says.

Measures costs against norms

CHS's system uses Diagnosis Related Groups (DRG) — the statistical model used to gauge Medicaid reimbursements — to compare a company's health care benefit costs against norms. DRGs helped, which the company founders helped develop while at Yale, to factor in patient acuity and length of hospital stay to determine average health care costs for specific categories of illness.

The company has built up a catalog of clients ranging from multinational conglomerates to state governments and nonprofit organizations. Among them are American Express Co.,

American Red Cross, AT&T, General Motors Corp., the state of New York and Metro North, the arm of the Metropolitan Transit Authority responsible for commuter rail service in northern suburbs of New York.

At Metro North, it became painfully obvious earlier this year that health care costs were skyrocketing. While overall expenses increased 25% from 1985 to 1986, costs for Metro North's major medical plan for some 6,300 employees were up 45% in the same time period.

CHS discovered part among the reasons for the railroad's increasing health care costs was the fact that employees were remaining in expensive care too long. CHS put together a detailed analysis of Metro North's major medical benefits and devised what it calls a savings-oriented action plan (SOAP).

In the SOAP, CHS prescribed a program that it said could save Metro North \$2 million under optimal conditions. Its recommendations included preadmission reviews to determine hospital stays, "third-party treatment for long-term illness, more home health care and skilled nursing, second surgical opinions, mandatory outpatient and presurgical testing and preventive programs.

Anticipating cost hikes is even more important, Dick Bahr, assistant director of personnel and compensation and benefits for Metro North, points out. He has CHS prepared a health care cost analysis for the next five years based on employee demographics. Bahr declined to say how much it has cost Metro North to have CHS analyze its health care costs. "Whatever it costs, it's well worth it," he says.

"One phone call...and I can place my clients' advertising in virtually any computer market in the world."

Ellen Freeman is president of Freeman Associates, a media planning and buying service for high-tech advertisers. With 11 years of agency experience, Ellen is one of a handful of people who understands how to plan media for high-tech companies. She has been involved with international as well as domestic programs, and she has definite opinions about the services of CW Communications.

Ellen explains, "High-tech companies generally don't have the information they need to evaluate international markets. But CW International Marketing Services makes it easy to explore foreign markets by offering depth marketing knowledge and expertise."

Ellen recognizes the frustration of media buyers when considering foreign media. She says, "There are so many factors involved — time and language differences, communication structures, exchange rates, taxes, translation, mechanical specs. Billing alone is a nightmare." She adds, "But CW offers the single-vendor solution. One phone call to a local rep, and I can place my clients' advertising in virtually any computer market in the world."

She continues, "There is a definite lack of research available on foreign publications in comparison to the volume of circulation and readership information provided by U.S. publications." However, Ellen trusts CW International Marketing Services to help her make media choices. She explains, "CW brings more information to the table than any company I've dealt with. No one else makes international buying as easy."

Ellen sums it up, "There are too many things U.S. media buyers take for granted. Buyers generally don't even know the right questions to ask when dealing abroad. CW helps us plan and buy media in multiple countries — all in one 'American' package, eliminating costly errors."

To find out how CW International Marketing Services can help you, call Frank Cutilia, Managing Director, toll-free at 800-343-6474 (in MA, 617-879-0700).



Ellen Freeman
President
Freeman Associates
Wellesley, MA

Avoiding the burnout blues

From page 43

• Set the person loose working on a small project with clearly defined goals. This allows the employee to step back and refocus his attention on a task that is less overwhelming and offers a fresh challenge.

• Encourage the employee to seek out new information, challenge your employee to see his position and his surroundings in a new light.

• Allow tinkering with new ideas. Tinkering with a pet project can interest employees in their work again.

• Try to maintain a rich work environment. Unnecessary drudgery work for all employees — especially those experiencing a period of burnout — should be kept to a minimum.

• Be a cheerleader. Employees need feedback. The value of a pat on the back or a well-deserved word of encouragement simply cannot be underestimated.

MIS bonuses a mixed bag

From page 43

get the bonuses of two to three times their salary that some traders and salesmen win, but some may get 100% of salary, according to Tamblyn.

"A level of two down you might find 50%," he adds.

This year's Wall Street MIS bonuses appear to be at least as big as last year's, Tamblyn adds.

Innovative bonuses

Bonuses for MIS workers are appearing in a variety of innovative forms.

These forms include the task mastery bonus, which is offered for managing a specific task, and the team bonus, which is offered for work done on a major project, according to Ronald LeBlanc, who is a managing partner of Software People Concepts, Inc. in New Haven, Conn.

Bonuses are also being used as an extra attraction for MIS workers when companies require salary equality among divisions, LeBlanc says.



375 Cochituate Road, Box 9171, Framingham, MA 01701-9171

NEW PRODUCTS

Digital Products offers 30-port data exchange

Digital Products, Inc., based in Watertown, Mass., has announced a 30-port version of its Netcommander intelligent data exchange.

The Netcommander 30 is available in two versions: One uses DB 25 RS-232 cables, and the other uses RJ-45 telephone cables for two- and four-pair twisted-pair RS-232 connections. One- or two-box configurations are available. IBM Token-Ring cables can also be used on the RJ models, the vendor said.

All models have a minimum 500K-byte random-access memory (RAM) buffer and are available with 32K-, 1M-, 2M- and 4M-byte buffers.

Provides port selection

Netcommander is an asynchronous network that uses the vendor's Subian technology, said to provide port selection and contention management, printer and other peripheral sharing, file transfer and data collection.

Netcommander can link up to 30 asynchronous serial and parallel computers and peripherals of any combination of manufacturers, the vendor said.

The Subian also is able to be a server in larger LANs through standard network interfaces or through the vendor's IBM Systems Network Architecture gateway offering.

Handles multiple protocols

Features of the Netcommander 30 include the ability to handle multiple protocols, bit rates, and job management while providing a hardware buffer for print spooling, message store-and-forward and speed changes. Rates range from 6.6K to 19.2K bit/sec.

The device automatically establishes multiple concurrent point-to-point links and can store up to 64 messages or print jobs and schedule them automatically at priority queue.

The Netcommander 30 costs \$3,895 for the 32K-byte version and \$5,495 for the 500K-byte unit.

EMC adds expansion card for 3880 DASD models

EMC Corp. in Natick, Mass., has announced a cache expansion card for IBM's 3880 Storage Control Unit Models 21 and 23.

According to a company spokesman, IBM's 3880 is a direct-access storage device (DASD) controller unit featuring an electronic cache subsystem. The EMC upgrade expands the caching capability of the Model 21 and the Model 23.

Caching, the vendor explained, is a process by which the controller stores commonly used information in high-speed random-access memory (RAM) in anticipation of future use. It is said to improve system response time by reducing the number of time-consuming disk accesses that must be performed by the storage control unit.

EMC's cache storage upgrades are available in 16M-byte increments, which con-

sist of four 4M-byte cards. In addition, 1M-byte RAM devices are used to achieve the 4M-byte capacities. Both the Model 23 and Model 21 controllers can be upgraded to a maximum of 64M bytes.

Cache storage benefits

The spokesman said that by increasing the amount of information that can be held in cache storage, users will see a corresponding improvement in system performance.

Adding additional cache capacity to the 3880 controller also decreases the programming time needed for system tuning and increases DASD lifetime, the spokesman added.

A 16M-byte upgrade costs \$48,000. Delivery will begin in January, the vendor said.

Compiler ties AI to workstations

Ports programs created on Symbolics 3600s

Symbolics, Inc. in Concord, Mass., has introduced its Symbolics CommonLISP Cross Compiler.

The company claimed the product allows users to port artificial intelligence programs developed on Symbolics 3600 family machines to general-purpose workstations.

The CommonLISP Cross Compiler, written by Lucid, Inc., is said to support Motorola Inc. MC68000-based workstations from Sun Microsystems, Inc. and Apollo Computer, Inc.

Cross-compiler integration

According to a company spokesman, integration of the cross compiler with Symbolics' software development environment enables programmers to use the editing and debugging facilities of the vendor's Genera software environment in the de-

sign and development cycle.

This holds true even if the programmers are developing applications to run on general-purpose machines.

The environment supports features such as rapid prototyping, symbolic debugging, incremental compilation and advanced user-code generation, according to the vendor.

Testing in design phase

These features are said to allow the concept to be tested in the design phase, rather than at delivery.

Genera includes Symbolics CommonLISP, New Flavor object-oriented programming, a dynamic window system, real-time editor and document examiner for on-screen access to the system's documentation.

The CommonLISP Cross Compiler is priced at \$11,000. According to the vendor, it requires Genera Release 6.1 or higher on the Symbolics system as well as Lucid CommonLISP running on the target machine.

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IBM
printf("Hello, world\n");

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NEW PRODUCTS/SOFTWARE & SERVICES

SOFTWARE & SERVICES**Systems software**

Promod, Inc. has introduced Promod/RT, a systems software computer-aided software engineering environment for the analysis and design of real-time programs.

Promod/RT is available for the Digital Equipment Corp. VAX and IBM Personal Computer environments. According to the vendor, it automatically transforms system description data as developed during structured analysis into a control-oriented modular design hierarchy.

Promod/RT allows the separate decomposition of data and control flows and provides text editing and graphics tools.

Promod/RT is priced from \$25,000 for DEC VAX versions and \$9,950 for PC versions.

Promod, 22961 Alcalde Drive, Laguna Hills, Calif. 92653.

Applications packages

ICL North America has announced Sales Force, a hardware and software system designed to automate sales departments.

Sales Force includes ICL's DS series of departmental computers, data base, office automation, communications, and sales management software. It provides software for call management, customer profiles, sales forecasting and planning and sales performance and administration.

A Sales Force system for a department of 20 sales representatives, including software and a DS Model 4 departmental computer, costs \$45,000.

ICL North America, P.O. Box 10276, 777 Long Ridge Road, Stamford, Conn. 06904.

Languages

Whitesmiths Ltd. has ported its Version 3.0 C and Pascal cross compilers to the Gould, Inc. Powernode 6000 and 9000 series.

The compilers support the development of freestanding programs or programs to be hosted under Microsoft Corp. MS-DOS or IBM PC-DOS. Features include a C source-level interactive debugger with breakpointing and variable display, enhanced support for read-only memory able code and improved code generation, the vendor said. The compilers also produce compiler and assembler source listings.

The Gould-hosted C cross compiler costs \$3,000. With Pascal included, the price is \$3,500.

Whitesmiths, 97 Lowell Road, Concord, Mass. 01742.

MICROCOMPUTERS**Systems**

Point of Sale Systems Corp. has introduced a multiuser IBM Personal Computer version of its Manager's Assistant retail point-of-sale inventory control software.

The Manager's Assistant is an integrated software system. It replaces conventional cash registers with sales terminals linked to an in-house multiuser computer. Administrative terminals are also linked to the computer and are used for purchase or-

ders, receiving, reporting and other inventory-related applications.

The Manager's Assistant costs \$2,250. Including hardware, software, installation, training, maintenance and technical support, prices start at \$7,000.

Point of Sale Systems, 706 Chippe-wa Sq., Marquette, Mich. 49855.

Software applications packages

Daybreak Technologies, Inc. has unveiled Silk, a spreadsheet software package for the IBM Personal Computer and compatibles.

Silk features Lotus Development Corp. 1-2-3-compatibility as well as on-line Help, English language formulas and keystroke recording. Other features include data entry validation, two levels of security,

background printing and support for Intel Corp. 8087 and 80287 math coprocessors.

Silk is priced at \$149. Daybreak Technologies, Suite 103, 2271 205th St., Tarrant, Calif. 90501.

Software languages

Barrington Systems has enhanced its Clarion programming language.

Added features include a converter utility for importing and exporting Data Interchange Format, Ashton-Tate Database II and III and Basic files and the availability of no-cost run-time modules to support Clarion-based applications.

Other features include a Cross-refer utility providing a cross reference of data labels; an open file extension that bypasses the DOS

limitation of 20 open files; and a file selection window that acts as a mini director utility to allow the user to select a file name from a list of file names.

Clarion Version 1.1 costs \$395. Barrington Systems, Suite 200, 150 E. Sample Road, Pompano Beach, Fla. 33064.

COMMUNICATIONS**Communication controllers**

Standard Microsystems Corp. has introduced the Active Link-Opt2 building-to-building two-port fiber-optic hub.

The Active Link-Opt2 is said to provide one coaxial and one fiber-optic port for the interconnection of any Datapoint Corp. Arcnet-based

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Requirements include 2+ years experience as a Systems Programmer in an IBM environment using MVS, JES2, COBOL, and Assembler. Must be able to work top level in problem definition, design and resolution, good oral and written communications skills, and a BS/BSA degree in a related area.

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Piedmont Natural Gas Co., Inc.
P.O. Box 33068
Charlotte, NC 28233

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Experience in the development of quality control procedures and standards for the production of software and hardware products.

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COMPUTER INDUSTRY

AT&T suffers 27,400-job cut

By Clinton Wilder

NEW YORK — AT&T announced its long-awaited layoff and cost-reduction measures late last week, cutting 27,400 jobs and anticipating a whopping \$3.2 billion pretax charge in the fourth quarter.

The layoffs, which have been the subject of intense industry speculation for several months, are the key component of a major corporate downsizing. AT&T has been in the process of refocusing its strategy away from computers and office equipment, businesses in which it will lose more than \$500 million this year, analysts estimate.

An after-tax charge of \$1.7 billion, or \$1.53 per share, will cause AT&T

to report a loss for the fourth quarter, but the telecommunications giant said it will show a small profit for the year. However, a one-time gain of \$100 million in the first quarter from a change in pension-fund accounting [CW, April 21] may be all that keeps AT&T out of the red for the year.

The work force reductions, most of which will take place in 1987, will include 8% of AT&T's management ranks and 9% of its nonmanagement employees. The pretax charges will include \$1 billion for personnel costs, \$1.2 billion for plant closings and facilities consolidation and \$1 billion for inventory write-downs, primarily for unspecified communications and office automation gear.

BUSINESS NOTES

IBM retirement plan attracts 10,000

More than 10,000 IBM employees will take advantage of Big Blue's previously announced early retirement program, exceeding the company's expectations. IBM will take a \$250 million charge for the retirements, plus other unspecified charges, in the fourth quarter.

An IBM statement sounded a cautionary note for the firm's financial outcome, noting that the retirements will negatively impact this year's earnings and will not produce savings until the second half of 1987.

The company "sees no signs of improvement in its general worldwide business climate as 1987 approaches," the statement said.

3Com Corp. reported that sales and profits roughly doubled in its second quarter ended Nov. 30. The Mountain View, Calif.-based local-area network firm earned \$1.4 million, or 10 cents per share, on revenue of \$28.3 million.

President and Chief Executive Officer Bill Krause cited strong incoming orders for the 3Server network server and 3+ software and said 3Com awarded \$52,000 in performance incentive bonuses to its employees.

3Com archival Novell, Inc. reported virtually identical \$28.3 million in revenue for its fourth quarter ended Oct. 25, a 130% increase over year-earlier sales. Profits roughly doubled to \$3.4 million, or 29 cents per share.

For the year, Novell's sales rose to \$81.5 million from \$33.6 million

in fiscal 1985. Earnings were \$10.1 million, or 90 cents per share, up from \$4.4 million, or 41 cents per share, in the prior year.

Digital Equipment Corp. will lose two vice-presidents in the near future. A DEC spokesman confirmed that Edward Kramer, vice-president of technical marketing, will leave in early 1987 to seek a CEO job, while Jean-Claude Peterschmitt will leave in March to work with Third World nonprofit organizations.

Software Research Corp. (SRC) has told two of its major customers that it is no longer operating as a company, the customers told Computerworld.

Having begun 1986 with a work force of approximately 125, the Natick, Mass., networking software firm had reduced the company's work force to a handful of employees. Calls to SRC President, Martin Waters were not returned.

Bridge Communications, Inc. has announced its intent to acquire Phoenix Technology, Inc. for an undisclosed amount.

The acquisition is expected to improve Bridge's competitive position with Ungermann-Bass, Inc. in the Ethernet and token ring-based local-area network market. Phoenix has developed a fault-tolerant Transmission Control Protocol/Internet Protocol communications server based on the Bridge CS/1 server.

Shareholder suits challenging the Perot buyout have been filed in federal court in Detroit, and in state courts in New York and Dover, Del.

A GM spokesman said the firm is aggressively pursuing all litigation. GM last week asked for dismissal of the Delaware suit.

Richard Schiffman, a Chicago attorney representing several shareholders in the federal case in Detroit, speculated that Perot is keeping his money in escrow in hopes that the weight of shareholder suits could force GM to reverse its buyout decision.

Stocks rise for investors of micro software big three



ACTIVE ISSUES
Kathy Porteus

There should be no Scrooges this year among investors in Ashton-Tate (STC—404), Lotus Development Corp. (LOTS—532) and Microsoft Corp. (MSFT—46). During the past year, each of these top performing technology stocks had boosted the value of its investors' holdings by more than 100%.

Analysts attribute this bonanza to dual injections of quarterly earnings gains and expansion of price/earnings multiples. According to Omer Ezra of Hambrick & Quist, Inc., new products and the resurgence of demand for micros have propelled sales and profits for these three companies, which Ezra calls the micro software oligopoly.

According to Rathan Quindlen, analyst with Alex Brown & Sons, Inc., investors began to recognize that fundamental changes in the micro software market — such as price stability and fewer, more mature players — have enhanced growth potential and reduced risk in these stocks.

Such a shift in investor perception underscores the near doubling of the group's price/earnings multiple since August, Quindlen says.

Price/earnings multiples are determined by multiplying a company's current price per share by its earnings for either a future reporting period or for the past 12 months.

With such an impressive performance behind them, do the stocks of Ashton-Tate, Lotus and Microsoft still represent investment opportunities? Analysts agree that the move

Porteus is president of Strand Research Associates, a Cerritoville, Mass.-based company that provides customized research services for financial and high-tech firms.

for these stocks is by no means over.

"On average, Lotus, Microsoft and Ashton-Tate could post another 30% rise in stock price in the coming year," Ezra says. While Ezra says that IBM's expected Intel Corp. 80386-based microcomputer may initially confuse the market, such risks will be offset by product introductions by each software company.

Each analyst, however, has favorites in the micro software group.

Because he suspects competition will be more intense in the area of data base management software, which is Ashton-Tate's forte, Ezra recommends Lotus and Microsoft, "where the risk/reward are a little better." According to Ashton-Tate, will earn \$1.70 to \$1.80 per share in fiscal 1987 ending Jan. 30, up \$2.60 to \$2.80 per share next year. For Microsoft, Ezra estimates earnings of \$2 to \$2.20 per share for the year ending June 30, 1987; for Lotus, he estimates earnings of \$3.80 per share for fiscal 1987 ending next December.

Harvey Allison, analyst with Wertheim & Co., says, "the price/earnings multiples and risk factors argue that Microsoft and Ashton-Tate have further to go now, on a percentage basis, than Lotus' stock." Nevertheless, Allison adds that he is "not unhappy about any of these stocks and would not sell at current price levels."

For Charlotte Walker of L.F. Rothschild, Unterberg, Towbin, Lotus and Ashton-Tate represent the "primary investment vehicles" in the group because they continue to be valued more generously than Microsoft. "Investors have historically supported a higher price/earnings multiple for Microsoft because of the company's monopoly on the operating system used in IBM Personal Computers and compatibles.

Alex Brown's Quindlen recommends purchase of each company, ranking Microsoft first, followed by Ashton-Tate and Lotus. She says such a strategy is possible because the products currently driving each company are totally different.

Microsoft keeps MS-DOS rights

From page 56

suit, alleging that Microsoft amended the 1981 contract from a license to a direct sale at the last minute.

Microsoft attorney Kari Quackenbush called the fraud allegation "a desperate act and total junk." The judge found that the contract was an arm's-length agreement, both parties were sophisticated and nobody took advantage of anybody," he added.

Quackenbush said the damages could have gone to Microsoft instead, if Seattle Computer illegally licensed MS-DOS to other manufacturers for use with hardware other than their own boards. However, he added, the small firm is unlikely to have many assets left to repay Microsoft.

By agreement, neither party would comment on the settlement except in a joint statement that said neither will appeal and that Seattle Computer will drop claims to further updates of MS-DOS.

'Business as usual' at EDS

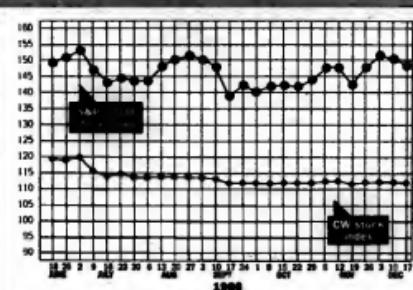
From page 56

tional Investors met with Perot and GM executives in New York to voice their displeasure regarding the transaction. The council, whose pension fund members are said to own about six million of GM's 317 million common shares, did not take any action, but is expected to meet again with GM at a later date.

COMPUTER INDUSTRY

MILLION DOLLARS

Computerworld stock trading index



Computer systems

Software and DP services

	12/10/86	12/17/86
Computer systems	114.3	118.0
Software and DP services	104.5	108.5
Peripherals and subsystems	102.0	104.0
Supplies and accessories	103.7	106.0
Semiconductors	75.2	76.3
Components	70.0	71.0
CW stock index	112.3	112.0
Standard & Poor's 500 stock index	150.1	148.0

Semiconductors

Peripherals and subsystems

Leasing companies

Supplies and accessories

Computerworld stock trading index

CLOSING PRICES WEDNESDAY, DECEMBER 17, 1986

EQUITY

	52-WEEK RANGE (\$)	CLOSING DEC. 17, 1986	WEEK CHG.	WEEK ACT. CHG.
COMPUTER SYSTEMS				
A ALPHATECH SYSTEMS	8 - 4	4.25	+0.1	+0.0
B ALTRONICS	15 - 10	10.00	-0.1	-0.0
C AMERICA CORP	26 - 12	23.62	-1.0	-0.0
D AMERICAN COMPUTER INC	44 - 21	17.00	+1.0	+0.0
E AMERICAN SYSTEMS	44 - 21	41.75	-1.3	-0.3
F AMI CORP	21 - 15	21.25	+0.0	+0.0
G CPT CORP	22 - 12	20.15	-0.6	-0.0
H ALTAIR COMPUTER CORP	20 - 10	10.00	-0.1	-0.0
I COMPUTER COMPANIES INC	50 - 25	43.63	-0.3	-0.0
J CONVERGENCE CORP	10 - 5	10.00	+0.0	+0.0
K CONVERGENCE TECH	10 - 5	5.30	-0.8	-0.0
L COULETEK INC	10 - 5	10.00	+0.0	+0.0
M DAISY SYS CORP	20 - 10	6.15	+0.0	+0.0
N DATAPOINT CORP	9 - 6	9.00	+0.0	+0.0
O DECISION POINT CORP	10 - 5	10.00	+0.0	+0.0
P FLOWING POINT SYCS INC	11 - 6	10.00	-0.1	-0.0
Q GOULD INC	15 - 10	10.00	-0.1	-0.0
R HONEYWELL INC	15 - 10	16.12	-0.4	-0.0
S HONEYWELL PACIFIC CO	20 - 10	12.00	-0.1	-0.0
T IBM	20 - 10	43.63	-0.3	-0.0
U INTEGRATED SYSTEMS INC	10 - 5	10.00	+0.0	+0.0
V ILLIUM INC	10 - 5	126.75	-1.3	-1.0
W ITT CORP	80 - 25	53.30	-0.8	-0.0
X MATHEWS ELECTRIC INC	10 - 5	10.00	-0.1	-0.0
Y TEXAS INSTRUMENTS INC	100 - 50	120.00	-0.5	-0.0
Z XEROX INC	10 - 5	10.00	-0.1	-0.0
SUPPLIES & ACCESSORIES				
A BARRY WHITNEY CORP	27 - 22	26.00	+2.4	+1.7
B DURLY INC	18 - 12	12.00	-0.1	-0.0
C EQUITY SUPPLY FORMS INC	11 - 7	15.00	-0.3	-0.4
D KMC CO	10 - 5	10.00	-0.1	-0.0
E MECRO INC	10 - 5	125.00	-0.1	-0.0
F MING LABS INC	11 - 7	125.00	-0.8	-0.7
G REXON CORP	10 - 5	10.00	-0.1	-0.0
H REXON INC	10 - 5	80.00	-0.8	-1.2
SOFTWARE & DP SERVICES				
A ADVANCED COMP'Y INC	7 - 4	3.81	-0.2	+0.2
B ADVANCED SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
C AMB COMPUTER INC	10 - 7	10.00	-0.1	-0.0
D AMERICAN SOFTWARE INC	10 - 7	10.00	-0.1	-0.0
E AMERICAN SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
F ANALYSTS INT'L CORP	9 - 4	8.00	-0.3	-0.3
G ABSTOR SATEL	6 - 3	4.00	-0.1	-0.0
H AEROTRONICS INC	40 - 20	42.00	+1.0	+2.4
I ALTRATECH INC	10 - 7	10.00	-0.1	-0.0
J ALTRATECH SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
K ALTRATECH SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
L ALTRATECH SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
M ALTRATECH SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
N ALTRATECH SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
O ALTRATECH SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
P ALTRATECH SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
Q ALTRATECH SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
R ALTRATECH SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
S ALTRATECH SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
T ALTRATECH SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
U ALTRATECH SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
V ALTRATECH SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
W ALTRATECH SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
X ALTRATECH SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
Y ALTRATECH SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
Z ALTRATECH SYSTEMS INC	10 - 7	10.00	-0.1	-0.0
PERIPHERALS & SUBSYSTEMS				
A AMI INC	9 - 6	8.50	-0.5	-3.7
B ANDREW ADDISON INC	10 - 7	10.00	-0.1	-0.0
C AST REISH INC	10 - 7	13.25	-0.4	-3.8
D AUTOMATRONICS INC	10 - 7	8.00	-0.5	-11.1
E BARTEL INC	10 - 7	8.00	-0.5	-0.0
F BARTEL INC & HORNADAY	10 - 7	8.00	-0.5	-0.0
G CEDEC CORP	9 - 5	4.00	-0.4	-7.1
H CHIPS & TECHNOLOGY CORP	10 - 7	10.00	-0.1	-0.0
I COMPUGRAPHIC CORP	26 - 19	26.25	+0.5	+2.8
J CONNAC CORP	10 - 7	13.00	-0.3	-1.6
K CONNAC CORP	10 - 7	13.00	-0.3	-1.6
L DATA FLOW CORP	10 - 7	8.75	-0.3	-0.8
M DATA FLOW CORP	10 - 7	8.00	-0.0	+0.0
N DATA FLOW CORP	10 - 7	8.00	-0.0	+0.0
O DECISION POINT CORP	23 - 8	8.00	-0.0	+0.0
P ENGENIA INC	24 - 14	8.00	-0.1	+0.0
Q ENGENIA INC	24 - 14	8.00	-0.1	+0.0
R FLOWING POINT SYCS INC	80 - 11	11.00	-0.4	-3.3
S GENERAL DATA COMM INC	9 - 6	8.00	-0.1	+0.0
T GENERAL DATA COMM INC	9 - 6	8.00	-0.1	+0.0
U KODAK CORP	13 - 9	12.00	-0.3	-0.0
V KODAK CORP	13 - 9	12.00	-0.3	-0.0
W LUMINAR INC	10 - 7	10.00	-0.1	+0.0
X LYNTAC INC	10 - 7	10.25	-0.5	-4.1
Y LYNTAC INC	10 - 7	10.25	-0.5	-4.1
Z MED DATA CORP	10 - 7	10.00	-0.1	+0.0
NETWORKS				
A NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
B NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
C NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
D NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
E NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
F NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
G NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
H NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
I NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
J NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
K NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
L NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
M NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
N NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
O NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
P NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
Q NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
R NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
S NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
T NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
U NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
V NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
W NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
X NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
Y NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
Z NORTHERN TELECOM LTD	120 - 90	120.00	-0.3	-2.0
LEASING COMPANIES				
A CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
B CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
C CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
D CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
E CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
F CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
G CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
H CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
I CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
J CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
K CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
L CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
M CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
N CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
O CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
P CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
Q CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
R CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
S CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
T CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
U CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
V CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
W CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
X CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
Y CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7
Z CONTINENTAL INFO SYS	120 - 90	17.75	-0.1	-0.7

EX-EX: EX-PORT; INT'L: INTERNATIONAL; P-PUBLIC: PUBLIC; R-REGISTERED; S-SUBSIDIARY; T-TRUSTEE; U-UNLISTED; C-COVERED; D-DIVIDEND; S-SPLIT
(+) IN NEAREST DOLLAR

(\$) IN NEAREST DOLLAR

(\$0.00 IN NEAREST DOLLAR)

(\$0.00 IN NEAREST DOLLAR)

COMPUTER INDUSTRY

INSIDE

Bell Atlantic adds to its software stable by acquiring networking software developer Technology Concepts/**\$6**

The AT&T layoff axe will cost 27,400 jobs and a \$3.2 billion pre-tax charge/**\$4**

IBM will take a \$250 million charge for early retirements/**\$5**

'Tis the season to be jolly for investors in Lotus, Microsoft and Ashton-Tate/**\$5**

INSTANT ANALYSIS

"The merger mania in corporate America is a boon to IBM and DEC, since combined companies usually rationalize their computer operations by kicking out the less established vendor."

— Steven Milmanovich
First Boston Corp.

Restructuring proves costly

Honeywell, CDC project substantial losses for year

By Clinton Wilder

MINNEAPOLIS — Honeywell, Inc. and Control Data Corp. announced last week that they will both report substantial losses for the year, owing mainly to restructuring charges.

Honeywell will post a loss of roughly \$380 million, or \$8.50 per share, by far the largest in its 101-year history. CDC, which lost \$567.5 million in 1985 during a severe debt crisis, will lose about \$250 million this year. It will take a fourth-quarter restructuring charge of \$200 million.

Honeywell, underscoring its exit from the computer business, will take approximately 1,000 charges and write-downs of approximately \$175 million, well in excess of earlier expectations. Approximately \$250 million (CW, Dec. 8). The figure will include \$400 million in charges related to the sale of most of Honeywell Information Systems in a joint venture with Compagnie des Machines Bull and NEC Corp. Honeywell will account for the computer unit as a "discontinued business."

The \$400 million charge includes the

previously announced \$250 million, representing the amount below book value for which Honeywell will sell the computer business; unrealized foreign exchange losses; the costs of reducing the information systems work force by a previously announced 800 employees; and other costs associated with accounting for the transfer to the new, unnamed venture.

The additional \$175 million includes restructuring charges for Honeywell's aerospace and building and industrial controls business, plus funds to service the debt incurred in the \$1.08 billion purchase of Unisys Corp.'s Sperry aerospace business.

Honeywell also announced it will reduce its 42.5% stake in the new venture to 19.9% at the end of 1988. After that, Bull will own 65.1% and NEC 15%.

"They are simply writing off the computer business," said Gary Blaser, an analyst with Dain Rauscher, Inc. in Minneapolis. "Now we can see why they were willing to part with it for such a low price. They were tired of meandering around with it and wanted to wash their hands of it completely."

CDC Chief Financial Officer John K. Buckner said the company's fourth-quarter charges bring its major restructuring program to an end.

Microsoft keeps MS-DOS rights

By Peggy Watt

SEATTLE — Microsoft Corp. will pay \$25,000 to Seattle Computer Products, Inc. in return for keeping all disputed rights to MS-DOS, ending a civil suit that threatened Microsoft's monopoly on the widely used microcomputer operating system.

Wall Street analysts called last week's out-of-court settlement very positive for Microsoft. The settlement was reached after the case had gone to the jury for deliberation.

At least one financial analyst had cautioned investors to hold steady until the suit was settled but quickly revised his assessment as Microsoft won some pretrial limitations.

"I had pointed it out as a concern at first," said Bruce Johnston, analyst with

First Boston Corp. "But the settlement is very satisfactory for Microsoft. \$25,000 is peanuts, and the agreement ride any possibility of appeal."

William Shattuck, analyst with Montgomery Securities, said most investors, doubtful from the start that Seattle Computer had made a case. "But investors don't like to stand kind of uncertainly hanging over their heads," he said. "The settlement definitely seen as positive."

Seattle Computer's potential award was already limited by Judge Gerard M. Shanahan, who ruled early in the trial that the 1981 contract between the two companies applied only to versions of MS-DOS designed to run on Seattle Computers' Intel Corp. 8086-based hardware. Microsoft has said future versions of DOS will be de-

See MICROSOFT page 55

INDUSTRY INSIGHT

Clinton Wilder

The industry year in lists

Tax reform. Insider trading. Corruption. The headlines of 1986 are already being immortalized as the print media attempts to wrap up the last 12 months in a nice, neat package for posterity.

But within the computer industry, even with the definitive end-points of fiscal years and budget cycles, a year is not easily classified. Is 1986 the year the slump continued? Not for Digital Equipment Corp., Apple Computer, Inc. or Microsoft Corp. It wasn't even the long-awaited Year of the LAN.

With the obvious caveat that a year cannot be easily labeled, it is nonetheless defined by events, trends and personalities. Following, then, is the inaugural edition of "The Computer Industry Year in Lists." It is meant to be neither definitive nor beyond debate, but will, it is hoped, provide a useful framework to sort out the industry consolidations and upheavals of 1986, of which there was certainly no shortage.

The entries are not listed in any particular order.

The top 10 industry stories:

1. Burroughs Corp. acquires Sperry Corp. to form Unisys Corp.

2. IBM encounters financial troubles, including a very real specter of a takeover in November.

3. DEC enjoys financial, product and market windfalls.

4. Honeywell, Inc. spins off its computer business into a joint venture with NEC Corp. and Compagnie des Ma-

See INDUSTRY page 55

Wilder is Computerworld's senior editor, computer industry.

'Business as usual' after management upheaval at EDS

GM shareholders' suits challenge Perot buyout

By Atom Apoor

Electronic Data Systems Corp.'s (EDS) new president and chief executive officer, Lester Alberthal, said last week that there would be no changes in the strategy or daily operations of the firm despite the upheaval within the firm's executive ranks.

Meanwhile, EDS Founder and former Chairman H. Ross Perot's Dec. 15 deadline for parent company General Motors Corp. to reconsider its decision to buy his \$742.8 million worth of shares passed without action.

Institutional investors met with

Perot and GM executives last week to discuss the reasons behind GM's purchase of Perot's shares. A number of shareholder suits have been filed against GM regarding the Perot buyout.

Alberthal, who presented a theme of "business as usual" in a presentation to the New York Society of Security Analysts, said EDS would continue to operate autonomously and vigorously pursue business outside of GM. Alberthal assumed the chief executive post after the departure two weeks ago of Perot and three other top executives.

"GM has reaffirmed its commitment to allowing EDS the freedom to

retain its entrepreneurial spirit," Alberthal said. "They have no intention of 'GM-izing' EDS or changing EDS's traditional customer focus in any way."

The so-called new management team at EDS, Alberthal pointed out, has been running the company for the last few years. "Our top 150 managers have an average of 15 years' tenure with the company and the senior officers' tenures range from 15 to 22 years with EDS," Alberthal noted.

EDS is making headway toward resolving compensation received for GM projects, he said, an issue that has caused much consterna-

tion for executives of both firms. The "perpetual master agreement" EDS signed with GM last January gives EDS basic protection of cost plus profit in the absence of other service agreements.

Nine fixed-price contracts with GM business units, representing 8% of EDS's total GM revenue, have been signed, with the balance expected to be completed within the next six months, Alberthal said.

Regarding the status of Perot's Dec. 16 deadline with GM, an EDS spokesman said the two-week period was an arbitrary date "that sounded good to him." Perot did not remove the GM buyout funds from escrow last week.

Members of the Council of Institu-

See BUSINESS page 55



EDS's Alberthal



ARE YOU GETTING THE LATE-BREAKING NEWS TOO LATE?

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Chances are, it's the same person whose name is on top of your company's *Computerworld* routing slip. In fact, by the time the company copy gets to you, the hottest news in the computer community may already be lukewarm.

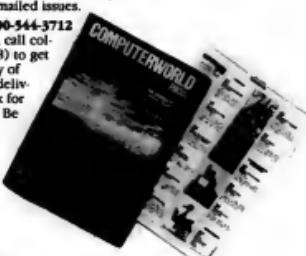
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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY



EVEN IN OUR EARLIEST DAYS, OUR EMPLOYEES EXHIBITED LEADERSHIP

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Promises don't count. You have to look at a company's actual history.

At McCormack & Dodge, we're in the unique position of having two histories, both distinguished, to submit for your consideration.

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when we began as a one-package software house in the Boston area. Through leadership technology, we grew to be a global company, serving the world's greatest corporations with a broad multi-package software line.

The second history belongs to our parent, Dun & Bradstreet. It dates back to pre-Civil War days, when one Mr. Lincoln worked as a D&B credit correspondent.

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